LESSON 1

Compare Fractions and Decimals

LESSON AT A GLANCE

Lesson Objective
Compare decimals, fractions, and mixed numbers on a number line.

Materials
MathBoard, Number Lines (see *eTeacher Resources*)

GO DIGITAL
- Animated Math Models
- *i*Tools: Fractions
- HMH Mega Math

1 TEACH and TALK

GO DIGITAL • Animated Math Models

Unlock the Problem

Math Processes and Practices

Help students understand how they can use a number line to compare fractions, decimals, and mixed numbers.

Distribute number lines to students. Discuss the meaning of the word *benchmark*: for fractions and decimals on a number line, they are marks between whole numbers that are a useful point of reference. Help students to identify some fractional benchmarks, such as $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, as well as decimal benchmarks, such as 0.25, 0.50, and 0.75.

- **Find 4.7, $4\frac{3}{5}$, and 4.35 on the number line. How can you tell which one has the greatest value?** The number that is farthest to the right on the number line is the greatest.

Try This!

- **Mark $\frac{1}{5}$ and 0.2 on the number line. What do you see?** They are equal to each other.
- **How does $\frac{5}{8}$ compare to 0.75?** $\frac{5}{8}$ is less than 0.75.

This lesson builds on decimal and fraction concepts presented in Chapters 3–8 and prepares students for comparisons between decimals and fractions taught in Grade 6.

Name _____

Compare Fractions and Decimals

Essential Question How can you compare decimals, fractions, and mixed numbers on a number line?

Unlock the Problem Real World

The Tech Club compared the weights of three cell phones. Estéban's phone weighed 4.7 ounces. Jill's phone weighed $4\frac{3}{5}$ ounces. Mona's phone weighed 4.35 ounces. Who has the phone with the lightest weight?

You can use a number line to compare fractions and decimals.

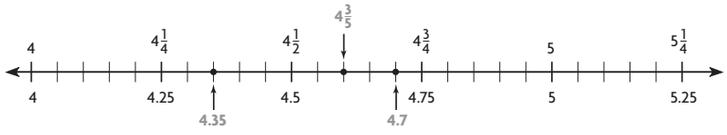
Remember: Greater values on a number line lie farther to the right.

- How can you identify the number with the least value?

Possible answer: The number that is farthest left on the number line has the least value.

Compare the values on a number line.

STEP 1 Locate some benchmarks.
- Benchmark decimals: 4, 4.25, 4.5, 4.75, 5…
- Benchmark mixed numbers: 4, $4\frac{1}{4}$, $4\frac{1}{2}$, $4\frac{3}{4}$, 5…



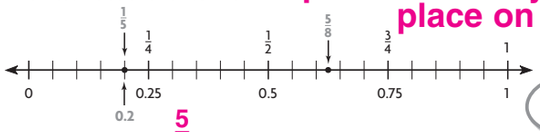
STEP 2 Mark the weight of each cell phone on the number line.
- Find the location of 4.7, $4\frac{3}{5}$, and 4.35.

Since $4.35 < 4\frac{3}{5} < 4.7$, Mona's phone is lightest.

Try This! Compare $\frac{1}{5}$, $\frac{5}{8}$, and 0.2. Which number has the greatest value?

- Mark each value on a number line.

Possible explanation: They are at the same place on the number line.



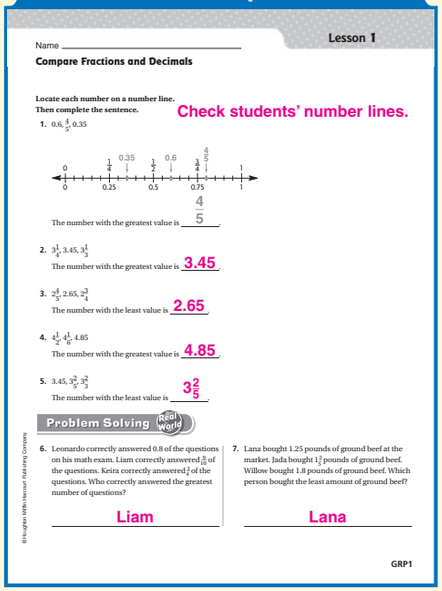
The greatest number is 5/8. **Explain** how you decided.

Of the three numbers, $\frac{5}{8}$ is farthest to the right.

Math Talk Mathematical Practices

Explain how you can tell that $\frac{1}{5}$ and 0.2 are equal.

GR: Practice, p. GRP1



Name _____ Lesson 1

Compare Fractions and Decimals

Locate each number on a number line. Then complete the sentence.

1. 0.6, $\frac{4}{5}$, 0.35 — Check students' number lines.

The number with the greatest value is 4/5.

2. $3\frac{1}{2}$, 3.45, $3\frac{1}{4}$

The number with the greatest value is 3.45.

3. $2\frac{4}{5}$, 2.65, $2\frac{2}{4}$

The number with the least value is 2.65.

4. $4\frac{1}{2}$, $4\frac{1}{6}$, 4.85

The number with the greatest value is 4.85.

5. 3.45, $3\frac{2}{5}$, $3\frac{2}{3}$

The number with the least value is $3\frac{2}{5}$.

Problem Solving Real World

6. Leonardo correctly answered 0.8 of the questions on his math exam. Liam correctly answered $\frac{8}{10}$ of the questions. Keira correctly answered $\frac{7}{8}$ of the questions. Who correctly answered the greatest number of questions?

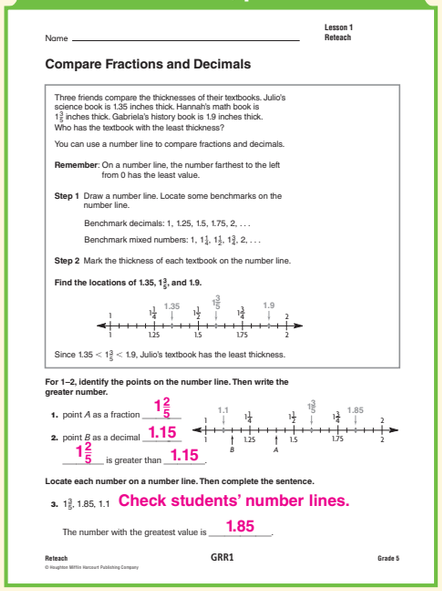
Liam

7. Lana bought 1.25 pounds of ground beef at the market. Jada bought $1\frac{2}{4}$ pounds of ground beef. Willow bought 1.8 pounds of ground beef. Which person bought the least amount of ground beef?

Lana

GRP1

GR: Reteach, p. GRR1



Name _____ Lesson 1 Reteach

Compare Fractions and Decimals

Three friends compare the thicknesses of their textbooks. Julio's science book is 1.35 inches thick. Hannah's math book is $1\frac{2}{5}$ inches thick. Gabriela's history book is 1.9 inches thick. Who has the textbook with the least thickness?

You can use a number line to compare fractions and decimals.

Remember: On a number line, the number farthest to the left from 0 has the least value.

Step 1 Draw a number line. Locate some benchmarks on the number line.

Benchmark decimals: 1, 1.25, 1.5, 1.75, 2, . . .

Benchmark mixed numbers: 1, $1\frac{1}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$, 2, . . .

Step 2 Mark the thickness of each textbook on the number line.

Find the locations of 1.35, $1\frac{2}{5}$, and 1.9.

Since $1.35 < 1\frac{2}{5} < 1.9$, Julio's textbook has the least thickness.

For 1–2, identify the points on the number line. Then write the greater number.

1. point *A* as a fraction $1\frac{2}{5}$

2. point *B* as a decimal 1.15

$1\frac{2}{5}$ is greater than 1.15.

Locate each number on a number line. Then complete the sentence.

3. $1\frac{3}{5}$, 1.85, 1.1 — Check students' number lines.

The number with the greatest value is 1.85.

Reteach GRR1 Grade 5

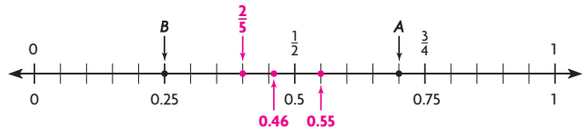
*GR – Getting Ready Lessons and Resources (*www.thinkcentral.com*)

Share and Show

For 1–2, identify the points on the number line.
Then write the greater number.

1. point A as a decimal **0.7**

2. point B as a fraction **$\frac{1}{4}$**



0.7 is greater.

Locate each number on a number line.
Then complete the sentence.

3. 0.55, $\frac{2}{5}$, 0.46 **Check students' number lines.**

The number with the greatest value is **0.55**.

On Your Own

Locate each number on a number line. Then complete the sentence.

4. 0.4, $\frac{3}{4}$, 0.15 **Check students' number lines.**

The number with the greatest value is **$\frac{3}{4}$**.

5. $2\frac{2}{3}$, 2.45, $2\frac{2}{5}$

The number with the least value is **$2\frac{2}{5}$**.

6 3.95, $3\frac{5}{6}$, $3\frac{4}{5}$

The number with the greatest value is **3.95**.

Problem Solving

7. Hannah made 0.7 of her free throws in a basketball game. Abra made $\frac{9}{10}$ of her free throws. Dena made $\frac{3}{4}$ of her free throws. Who was the best shooter? **Explain.**

Abra; Possible explanation: On a number line, $\frac{9}{10}$ is farther right than the other two numbers, so Abra made more of her free throws than the other players.

2 PRACTICE

Share and Show • Guided Practice

Encourage students to discuss how they chose the benchmark numbers for their number lines.

On Your Own • Independent Practice

Some students may need one-on-one assistance as they identify the benchmarks. Encourage students to express relationships using symbols, such as <, >, or =.

Problem Solving

Math Processes and Practices

Remind students how to begin by showing relevant benchmark fractions on a number line.

3 SUMMARIZE

Math Processes and Practices

Essential Question

How can you compare decimals, fractions, and mixed numbers on a number line? Possible answer: Identify the benchmarks on the number line as decimals and fractions. Locate the value of each number on the number line and graph a point. The point that is farthest to the right on the number line represents the greatest number.

Math Journal

WRITE Math

Explain how you can compare 0.65 and $\frac{3}{5}$.

LESSON 2

Order Fractions and Decimals

LESSON AT A GLANCE

Lesson Objective
Order decimals, fractions, and mixed numbers on a number line.

Materials
MathBoard, Number Lines (see *eTeacher Resources*)

GO DIGITAL
- Animated Math Models
- *i*Tools: Fractions
- HMH Mega Math

1 TEACH and TALK

GO DIGITAL • Animated Math Models

Unlock the Problem

Math Processes and Practices

Help students understand how to order decimals, fractions, and mixed numbers on a number line.

Distribute number lines to students. Review from the previous lesson the meaning of the term *benchmark*. Remind students that they can use benchmarks to compare quantities.

Read the problem aloud and help students to identify the decimal and fractional benchmarks. Have students work in pairs to locate each number on the number line.

- **Which number is greatest?** 0.97 **How can you tell?** It is farthest to the right on the number line.
- **Where is the number that has the least value?** It is farthest to the left.

Try This!

- **How do you know that 6.2 is greater than 6.03?** Possible answer: 6.2 is farther right on the number line than 6.03.

This lesson builds on decimal and fraction concepts presented in Chapters 3–8 and prepares students for comparisons between decimals and fractions taught in Grade 6.

Name _____

Order Fractions and Decimals

Essential Question How can you order decimals, fractions, and mixed numbers on a number line?

Unlock the Problem Real World

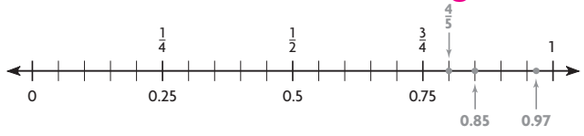
In tennis, Jocelyn's serve takes 0.97 of a second to reach her opponent. Dave's serve takes $\frac{4}{5}$ of a second. Monica's serve takes 0.85 of a second. Order the three serves from shortest to longest time.

- You want to order the times from shortest to longest. Should you read the numbers on the number line left to right or right to left?

Possible answer: Read left to right because the values increase from left to right.

Order the fractions and decimals on the number line.

STEP 1 Locate the benchmarks on the number line.
- Benchmark decimals: 0, 0.25, 0.5, 0.75, 1.
- Benchmark fractions: 0, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, 1.



STEP 2 Locate 0.97, $\frac{4}{5}$, and 0.85 on the number line.

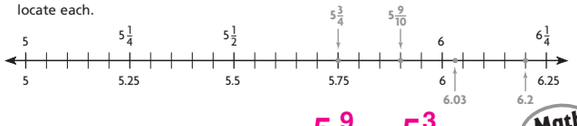
STEP 3 Order the fractions and decimals.

Remember: The point farthest to the left is the least value.

So, the times in order from shortest to longest are: 4/5, 0.85, 0.97.

Try This! Order 6.03, $5\frac{9}{10}$, $5\frac{3}{4}$, and 6.2 from greatest to least.

- Locate each fraction and decimal on the number line. Use benchmarks to help you locate each.



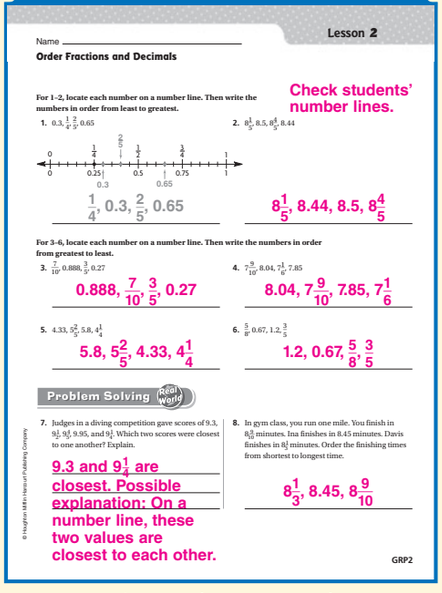
From the greatest to least: 6.2, 6.03, $5\frac{9}{10}$, $5\frac{3}{4}$

Math Talk Mathematical Practices

How does the number line help you order numbers from greatest to least?

Numbers to the right are greater than numbers to the left. So, I order the numbers from right to left.

GR: Practice, p. GRP2



Name _____ Lesson 2

Order Fractions and Decimals

For 1–2, locate each number on a number line. Then write the numbers in order from least to greatest. **Check students' number lines.**

1. 0.3, $\frac{1}{4}$, $\frac{2}{5}$, 0.65 — $\frac{1}{4}$, 0.3, $\frac{2}{5}$, 0.65
2. $8\frac{1}{5}$, 8.5, $8\frac{4}{5}$, 8.44 — $8\frac{1}{5}$, 8.44, 8.5, $8\frac{4}{5}$

For 3–6, locate each number on a number line. Then write the numbers in order from greatest to least.

3. $\frac{7}{10}$, 0.888, $\frac{3}{5}$, 0.27 — 0.888, $\frac{7}{10}$, $\frac{3}{5}$, 0.27
4. $7\frac{9}{10}$, 8.04, $7\frac{1}{6}$, 7.85 — 8.04, $7\frac{9}{10}$, 7.85, $7\frac{1}{6}$
5. 4.33, $5\frac{2}{5}$, 5.8, $4\frac{1}{4}$ — 5.8, $5\frac{2}{5}$, 4.33, $4\frac{1}{4}$
6. $\frac{5}{8}$, 0.67, 1.2, $\frac{3}{5}$ — 1.2, 0.67, $\frac{5}{8}$, $\frac{3}{5}$

Problem Solving Real World

7. Judges in a diving competition gave scores of 9.3, $9\frac{1}{4}$, $9\frac{9}{10}$, 9.95, and $9\frac{1}{2}$. Which two scores were closest to one another? Explain.

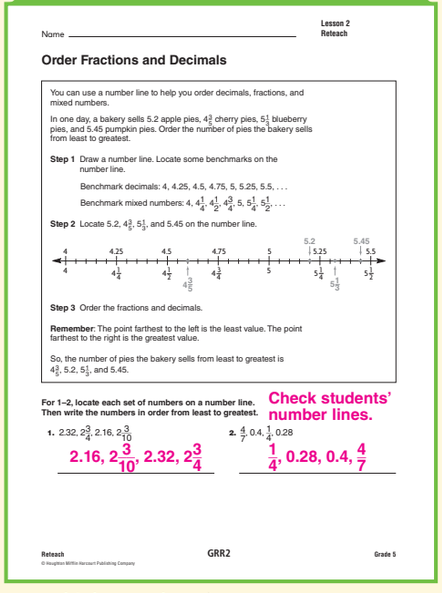
   9.3 and $9\frac{1}{4}$ are closest. Possible explanation: On a number line, these two values are closest to each other.

8. In gym class, you run one mile. You finish in $8\frac{1}{3}$ minutes. Ira finishes in 8.45 minutes. Davis finishes in $8\frac{9}{10}$ minutes. Order the finishing times from shortest to longest time.

   $8\frac{1}{3}$, 8.45, $8\frac{9}{10}$

GRP2

GR: Reteach, p. GRR2



Name _____ Lesson 2 Reteach

Order Fractions and Decimals

You can use a number line to help you order decimals, fractions, and mixed numbers.

In one day, a bakery sells 5.2 apple pies, $4\frac{3}{4}$ cherry pies, $5\frac{1}{4}$ blueberry pies, and 5.45 pumpkin pies. Order the number of pies the bakery sells from least to greatest.

Step 1 Draw a number line. Locate some benchmarks on the number line.

Benchmark decimals: 4, 4.25, 4.5, 4.75, 5, 5.25, 5.5, . . .

Benchmark mixed numbers: 4, $4\frac{1}{4}$, $4\frac{1}{2}$, $4\frac{3}{4}$, 5, $5\frac{1}{4}$, $5\frac{1}{2}$, . . .

Step 2 Locate 5.2, $4\frac{3}{4}$, $5\frac{1}{4}$, and 5.45 on the number line.

Step 3 Order the fractions and decimals.

Remember: The point farthest to the left is the least value. The point farthest to the right is the greatest value.

So, the number of pies the bakery sells from least to greatest is $4\frac{3}{4}$, 5.2, $5\frac{1}{4}$, and 5.45.

For 1–2, locate each set of numbers on a number line. Then write the numbers in order from least to greatest. **Check students' number lines.**

1. 2.32, $2\frac{3}{4}$, 2.16, $2\frac{3}{10}$ — 2.16, $2\frac{3}{10}$, 2.32, $2\frac{3}{4}$
2. $\frac{4}{7}$, 0.4, $\frac{1}{4}$, 0.28 — $\frac{1}{4}$, 0.28, 0.4, $\frac{4}{7}$

Reteach GRR2 Grade 5

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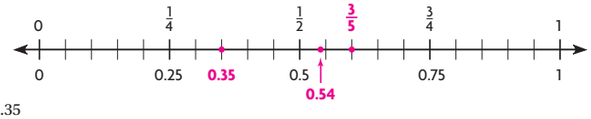
Share and Show

MATH BOARD

Locate each number on the number line.
Then write the numbers in order from least to greatest.



1. $\frac{3}{5}$, 0.54, 0.35

0.35, 0.54, $\frac{3}{5}$

For 2–3, locate each set of numbers on a number line.
Then write the numbers in order from greatest to least.

Check students' number lines.

2. 1.16, $1\frac{1}{4}$, 1.37, $1\frac{1}{10}$

1.37, $1\frac{1}{4}$, 1.16, $1\frac{1}{10}$

3. $\frac{5}{8}$, 0.5, $\frac{2}{5}$, 0.78

0.78, $\frac{5}{8}$, 0.5, $\frac{2}{5}$

On Your Own

For 4–5, locate each number on a number line.
Then write the numbers in order from least to greatest.

Check students' number lines.

4. 0.6, $\frac{1}{2}$, $\frac{2}{3}$, 0.39

0.39, $\frac{1}{2}$, 0.6, $\frac{2}{3}$

5. $7\frac{1}{4}$, 7.4, $7\frac{3}{4}$, 7.77

$7\frac{1}{4}$, 7.4, $7\frac{3}{4}$, 7.77

For 6–7, locate each number on a number line.
Then write the numbers in order from greatest to least.

Check students' number lines.

6. $\frac{3}{10}$, 0.222, $\frac{3}{5}$, 0.53

$\frac{3}{5}$, 0.53, $\frac{3}{10}$, 0.222

7. 2.96, $3\frac{1}{5}$, 3.48, $3\frac{1}{4}$

3.48, $3\frac{1}{4}$, $3\frac{1}{5}$, 2.96

Problem Solving

Real World

8. Judges in a skateboarding competition gave scores of 8.2, $8\frac{1}{3}$, $8\frac{4}{5}$, 8.44, and $8\frac{1}{5}$. Which two scores were closest to one another? **Explain.**

8.2 and $8\frac{1}{5}$ are equal, so they are closest. Possible explanation: I saw on the number line that the two values were in the same place, so they were closest.

2 PRACTICE

MATH BOARD

Share and Show • Guided Practice

Remind students to use fraction benchmarks when locating fractions and decimal benchmarks when locating decimals.

On Your Own • Independent Practice

Students may need additional help identifying the benchmarks for each number line.

Problem Solving Math Processes and Practices

Help students draw a number line that begins at 8 and ends at 9. Have students work together to identify useful fraction and decimal benchmarks between 8 and 9.

3 SUMMARIZE

Math Processes and Practices

Essential Question

How can you order decimals, fractions, and mixed numbers on a number line? Possible answer: First, put benchmarks on the number line. Then locate the numbers on the number line. You can read the numbers from least to greatest if you read the numbers on the line from left to right.

Math Journal WRITE Math

Draw a number line that begins at 4 and ends at 5. Mark and identify a mixed number and a decimal number on the number line. Then explain how you can tell which number is the greater of the two.

LESSON 3

Factor Trees

LESSON AT A GLANCE

Lesson Objective
Factor numbers using a factor tree.

Vocabulary
factor tree

Materials
MathBoard

This lesson builds on finding factors presented in Grade 4, and prepares students for finding greatest common factors taught in Grade 6.

1 TEACH and TALK

Unlock the Problem

Math Processes and Practices

Have students read the problem. Emphasize that when writing a number as a product of prime number factors, each factor must be greater than 1 and can have only 1 and itself as factors. Draw the beginning of the factor tree, shown in Step 1, on the board.

- **What are some pairs of factors for 24?** 4 × 6, 3 × 8, 12 × 2
- **Write 24 at the top of your factor tree. Let's use 4 and 6 as the factors of 24. Do each of these factors have only 1 and itself as factors?** no
- **What are the factors of 4?** 2 × 2 **What are the factors of 6?** 2 × 3
- **Do each of the factors 2 and 3 have only 1 and itself as factors?** yes

Try This!

Have students use one of the other pairs of factors for 24 to complete the problem. Have students share their factor trees with the class.

Use Math Talk to check students' understanding of factored numbers and common factors.

Name _____

Factor Trees

Essential Question How can you factor numbers using a factor tree?

Unlock the Problem (Real World)

Mr. Shu gives this puzzle to his math students.

"Write 24 as a product of factors that are prime. Remember that a prime number must be greater than 1 and can have only 1 and itself as factors."

You can use a diagram called a **factor tree** to find the factors of a number.

- Give an example of a number greater than 1 that has only 1 and itself as factors.

Possible answers: 2, 3, 5

Use a factor tree to find the prime number factors that have a product of 24.

STEP 1
Write the number to be factored at the top of the factor tree.

24

STEP 2
Write it as a product of any two factors.

Think: 4 × 6 = 24

24
4 × 6

STEP 3
Write each factor as the product of two factors.

Think: 2 × 2 = 4 and 2 × 3 = 6

24
4 × 6
2 × 2 × 2 × 3

STEP 4
Continue until each factor is a prime number.

Think: 2 × 1 = 2 and 3 × 1 = 3

Write the factors that are prime numbers from least to greatest.

2 × 2 × 2 × 3

So, 24 = 2 × 2 × 2 × 3.

Try This! Make a different factor tree for 24.

- Is the product of factors the same as in the Example? **Explain.**

Yes, the prime number factors are the same, no matter which factors I start with.

24
3 × 8
4 × 2
2 × 2

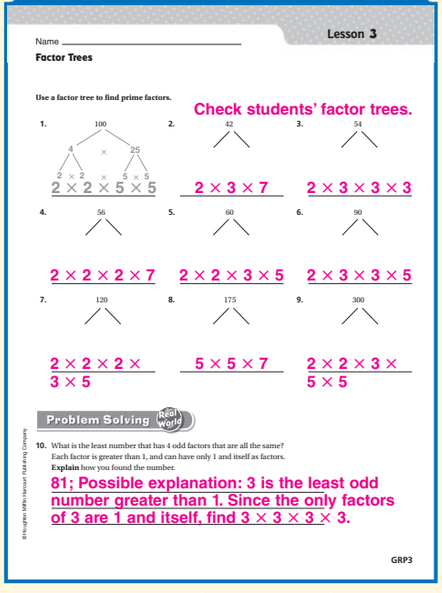
Check students' factor trees. Possible answer is given.

Math Talk Mathematical Practices

Explain how you can use factored numbers to find common factors.

See Planning Guide.

GR: Practice, p. GRP3



Name _____ Lesson 3

Factor Trees

Use a factor tree to find prime factors.

Check students' factor trees.

1. 100 → 4 × 25 → 2 × 2 × 5 × 5
2. 42 → 2 × 3 × 7
3. 54 → 2 × 3 × 3 × 3
4. 56 → 2 × 2 × 2 × 7
5. 60 → 2 × 2 × 3 × 5
6. 90 → 2 × 3 × 3 × 5
7. 120 → 2 × 2 × 2 × 3 × 5
8. 175 → 5 × 5 × 7
9. 300 → 2 × 2 × 3 × 5 × 5

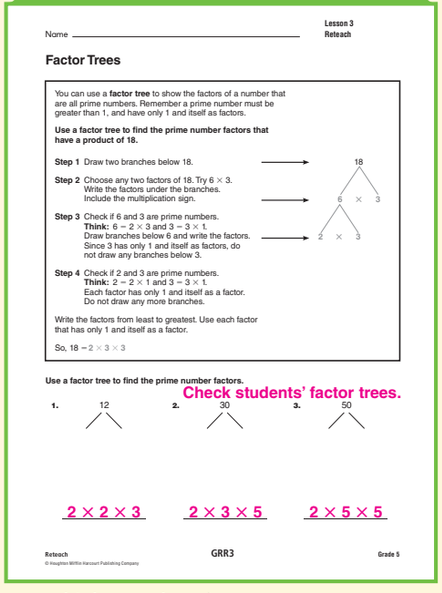
Problem Solving (Real World)

10. What is the least number that has 4 odd factors that are all the same? Each factor is greater than 1, and can have only 1 and itself as factors. **Explain** how you found the number.

81; Possible explanation: 3 is the least odd number greater than 1. Since the only factors of 3 are 1 and itself, find 3 × 3 × 3 × 3.

GRP3

GR: Reteach, p. GRR3



Name _____ Lesson 3 Reteach

Factor Trees

You can use a **factor tree** to show the factors of a number that are all prime numbers. Remember a prime number must be greater than 1, and have only 1 and itself as factors.

Use a factor tree to find the prime number factors that have a product of 18.

Step 1 Draw two branches below 18. → 18

Step 2 Choose any two factors of 18. Try 6 × 3. Write the factors under the branches. Include the multiplication sign. → 6 × 3

Step 3 Check if 6 and 3 are prime numbers. **Think:** 6 = 2 × 3 and 3 = 3 × 1. Draw branches below 6 and write the factors. Since 3 has only 1 and itself as factors, do not draw any branches below 3. → 2 × 3

Step 4 Check if 2 and 3 are prime numbers. **Think:** 2 = 2 × 1 and 3 = 3 × 1. Each factor has only 1 and itself as a factor. Do not draw any more branches.

Write the factors from least to greatest. Use each factor that has only 1 and itself as a factor.

So, 18 = 2 × 3 × 3

Use a factor tree to find the prime number factors.

Check students' factor trees.

1. 12 → 2 × 2 × 3
2. 30 → 2 × 3 × 5
3. 50 → 2 × 5 × 5

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GRR3

Grade 5

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Share and Show

MATH BOARD

1. Use a factor tree to find the prime number factors that have a product of 210.

- Write 210 as a product of any two factors.

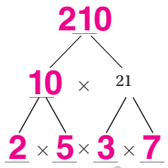
210 = 10 × 21

- Write each factor as the product of factors.

10 = 2 × 5 21 = 3 × 7

Now each factor has only 1 and itself as factors.

So, 210 = 2 × 3 × 5 × 7.



ERROR Alert

Remember to continue to factor a number if it has factors other than 1 and itself.

Use a factor tree to find the prime number factors.

Check students' factor trees.

2. 8 — 2 × 2 × 2

3. 45 — 3 × 3 × 5

4. 350 — 2 × 5 × 5 × 7

On Your Own

Use a factor tree to find the prime number factors.

Check students' factor trees.

5. 36 — 2 × 2 × 3 × 3

6. 72 — 2 × 2 × 2 × 3 × 3

7. 540 — 2 × 2 × 3 × 3 × 3 × 5

Problem Solving Real World

Mr. Shu gave these problems to his math students. Solve.

8. Write 500 as a product of prime number factors. Each factor must be greater than 1 and can have only 1 and itself as factors.

2 × 2 × 5 × 5 × 5

9. Find a number that has four identical even factors. Each factor must be greater than 1 and can have only 1 and itself as factors.

2 × 2 × 2 × 2 = 16

Use **Math Talk** to check students' understanding of factored numbers and common factors. Possible explanation: You can see what factors are the same for the two numbers; these would be common factors.

2 PRACTICE

MATH BOARD

Share and Show • Guided Practice

Work through Exercise 1 with students. For Exercises 2–4, have students share the first two factors they chose for each factor tree. Remind students to write the prime number factors from least to greatest.

On Your Own • Independent Practice

For Exercises 5–7, have students check their answers by multiplying the factors.

Problem Solving Math Processes and Practices

For Exercise 8, have students tell the first two factors they chose for 500. For Exercise 9, make sure students understand that the only even number that has 1 and itself as its only factors is 2.

3 SUMMARIZE

Math Processes and Practices

Essential Question

How can you factor numbers using a factor tree? Possible answer: I can make a factor tree, choose a pair of factors of the number, continue factoring each factor until each resulting factor on the tree is greater than 1 and has only 1 and itself as factors.

Math Journal WRITE Math

Draw two different factor trees for 40. Then write the factors for each factor tree from least to greatest.

LESSON 4

Model Percent

LESSON AT A GLANCE

Lesson Objective
Express real world quantities as percents and use them to solve problems.

Materials
MathBoard, 10 × 10 grids (see *eTeacher Resources*)

1 TEACH and TALK

Unlock the Problem

Math Processes and Practices

Write the word *percent* on the board. Tell students that percent means "per hundred" or "out of 100." Tell students that percents are similar to ratios and fractions. For example, sixty percent is the same as the fraction $\frac{60}{100}$ and the ratio 60 to 100.

Example 1

Distribute the 10 × 10 grids. Verify with students that there are 10 rows of 10 squares, for a total of 100 squares. Direct students to shade 53 squares.

- **How many rows or columns did you shade?** 5 **How many extra squares?** 3 **How many out of 100 are shaded?** 53
- **How can you write this quantity as a fraction?** $\frac{53}{100}$ **as a percent?** 53%

Example 2

- **What percent is represented by none of the squares being shaded?** 0% **half of the squares being shaded?** 50% **all of the squares being shaded?** 100%

This lesson builds on decimals to hundredths presented in Grade 4, and prepares students for finding a percent of a quantity taught in Grade 6.

Name _____

Model Percent

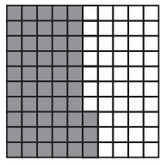
Essential Question How can you express real world quantities as percents and use them to solve problems?

Unlock the Problem (Real World)

Percent means "per hundred" or "out of 100." So, when you find percent you are finding a part of 100. Sixty percent, for example, means 60 out of 100. You can write percents using the percent symbol, %. So, 60 percent is written as 60%.

- What number is always compared in a percent? **100**

Example 1 Name the percent that is shaded.

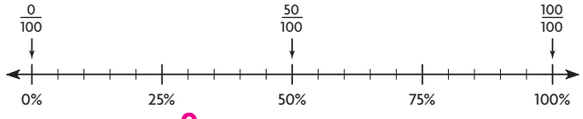


- 5 columns: 5 × 10 = 50.
- 3 squares: 3 × 1 = 3
- Total: 50 + 3 = 53 out of 100, or 53 percent is shaded.

Example 2 Name the percent that is not shaded.

- 4 columns: 4 × 10 = 40.
- 7 squares: 7 × 1 = 7
- Total: 40 + 7 = 47 out of 100, or 47 percent is not shaded.

Try This! Use the number line. Tell what these percents mean: 0 percent, 50 percent, 100 percent.



A. 0 percent means **0** out of 100, or none of the total.

B. 50 percent means **50** out of 100, or half of the total.

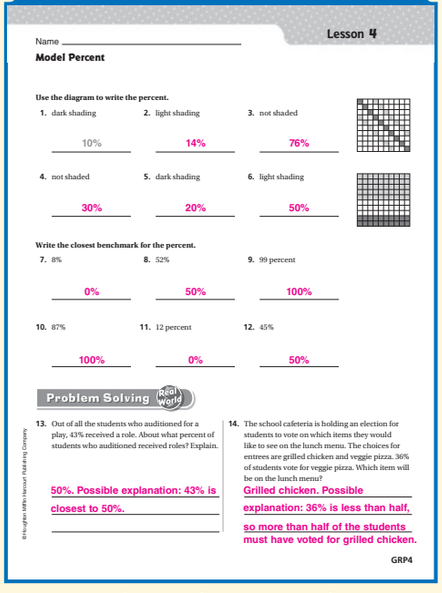
C. 100 percent means **100** out of 100, or all of the total.

50%; Possible explanation: On a number line 33% is closer to 50% than 0%.

Math Talk Mathematical Practices

Which benchmark is 33% closest to? **Explain** how you know.

GR: Practice, p. GRP4



Name _____ Lesson 4

Model Percent

Use the diagram to write the percent.

1. dark shading: 10%
2. light shading: 14%
3. not shaded: 76%
4. not shaded: 30%
5. dark shading: 20%
6. light shading: 50%

Write the closest benchmark for the percent.

7. 8%: 0%
8. 52%: 50%
9. 99 percent: 100%
10. 87%: 100%
11. 12 percent: 0%
12. 45%: 50%

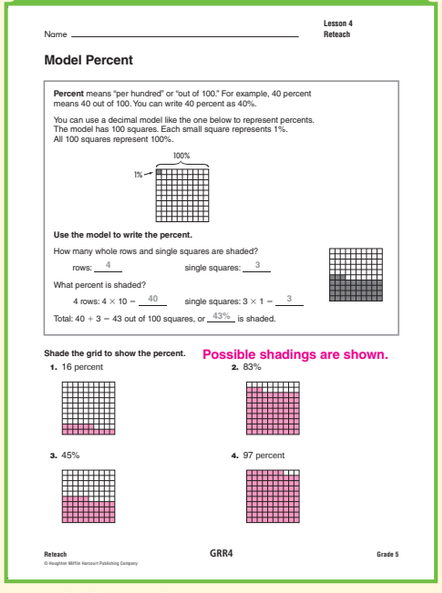
Problem Solving (Real World)

13. Out of all the students who auditioned for a play, 43% received a role. About what percent of students who auditioned received roles? Explain. 50%. Possible explanation: 43% is closest to 50%.

14. The school cafeteria is holding an election for students to vote on which items they would like to see on the lunch menu. The choices for entrees are grilled chicken and veggie pizza. 36% of students vote for veggie pizza. Which item will be on the lunch menu? Grilled chicken. Possible explanation: 36% is less than half, so more than half of the students must have voted for grilled chicken.

GRP4

GR: Reteach, p. GRR4



Name _____ Lesson 4 Reteach

Model Percent

Percent means "per hundred" or "out of 100." For example, 40 percent means 40 out of 100. You can write 40 percent as 40%.

You can use a decimal model like the one below to represent percents. The model has 100 squares. Each small square represents 1%. All 100 squares represent 100%.

1% 100%

Use the model to write the percent.

How many whole rows and single squares are shaded?
rows: 4 single squares: 3

What percent is shaded?
4 rows: 4 × 10 = 40 single squares: 3 × 1 = 3
Total: 40 + 3 = 43 out of 100 squares, or 43% is shaded.

Shade the grid to show the percent. Possible shadings are shown.

1. 16 percent
2. 83%
3. 45%
4. 97 percent

Reteach

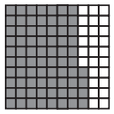
GRR4 Grade 5

*GR – Getting Ready Lessons and Resources (*www.thinkcentral.com*)

Share and Show

Use the diagram to write the percent.

1. How many whole columns and single squares are shaded?
   7 columns, 4 single squares

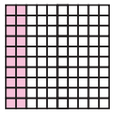


2. What percent is shaded?
   74%

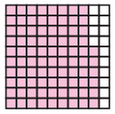
3. What percent is unshaded?
   26%

Shade the grid to show the percent. Possible shading shown.

4. 20 percent

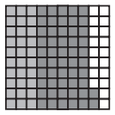


5. 86 percent



On Your Own

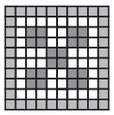
Use the diagram to write the percent.



6. light shading
   30%

7. dark shading
   52%

8. not shaded
   18%



9. not shaded
   44%

10. dark shading
    20%

11. light shading
    36%

Write the closest benchmark for the percent.

12. 48%
    50%

13. 94%
    100%

14. 4%
    0%

Problem Solving

15. In an election between Warren and Jorge, Warren declared victory because he received 58 percent of the vote. Is he correct? **Explain**.
    Yes; Possible explanation: He is correct because 58% is greater than half, or 50% of the vote.

2 PRACTICE

Share and Show • Guided Practice

For Exercises 2 and 3, clarify with students that the percent shaded and the percent unshaded combined should add up to all of the grid, or 100%.

On Your Own • Independent Practice

For Exercises 6–11, help students to check their work by adding up the three percents to see if the total is 100%.

Problem Solving Math Processes and Practices

Have students shade 58% of a grid and compare to half, or 50%, of the grid.

3 SUMMARIZE

Math Processes and Practices

Essential Question

How can you express real world quantities as percents and use them to solve problems?

Possible answer: You can relate a real world quantity as a percent using a 10 × 10 grid and then compare its size to a benchmark: 0%, 50%, or 100%.

Math Journal WRITE Math

A portion of a grid is shaded. Explain why the sum of the shaded and unshaded portions of the grid equals 100 percent of the grid.

LESSON 5

Relate Decimals and Percents

LESSON AT A GLANCE

Lesson Objective
Express decimals as percents and percents as decimals.

Materials
MathBoard, 10 × 10 grids (see *eTeacher Resources*)

GO DIGITAL Animated Math Models

1 TEACH and TALK

GO DIGITAL • Animated Math Models

Unlock the Problem

Math Processes and Practices

Help students understand how to express decimals as percents and percents as decimals. Tell students that decimals and percents are two ways to express the same number. Distribute 10 × 10 grids to demonstrate an example.

Direct students to shade in 5 rows and 4 single squares on the grid. Clarify that they have shaded in 54 out of 100 squares. Tell students that they can express this as 54%, $\frac{54}{100}$, or 0.54.

- **Look at Example 1. How do you express this number as a fraction? $\frac{42}{100}$ as a percent?** 42% **as a decimal?** 0.42
- **Look at Example 2. How do you express this number as a fraction? $\frac{19}{100}$ as a percent?** 19% **as a decimal?** 0.19
- **How can you describe the pattern you see?** Possible description: The decimal has the same digits as the numerator of the fraction. The decimal point comes before the two digits. The percent has the same digits as the numerator with a % after them.

This lesson builds on writing decimal notation for fractions presented in Grade 4, and prepares students for finding a percent of a quantity taught in Grade 6.

Name _____

Relate Decimals and Percents

Essential Question How can you express decimals as percents and percents as decimals?

Unlock the Problem Real World

Decimals and percents are two ways of expressing the same number. You can write a percent as a decimal. You can also write a decimal as a percent.

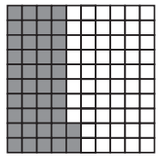
- In percent, the "whole" is 100. What is the "whole" in decimal form? **1.0, or 1.00**

Example 1 **Model 0.42. Write 0.42 as a percent.**

STEP 1 Write the decimal as a ratio.
0.42 = 42 hundredths = 42 out of 100.

STEP 2 Make a model that shows 42 out of 100.

STEP 3 Use the model to write a percent.
42 shaded squares = **42** percent, or **42** %

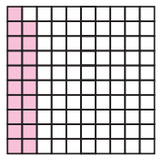


Example 2 **Model 19 percent. Write 19% as a decimal.**

STEP 1 Write the percent as a fraction.
19% = $\frac{19}{100}$

STEP 2 Make a model that shows 19 out of 100.

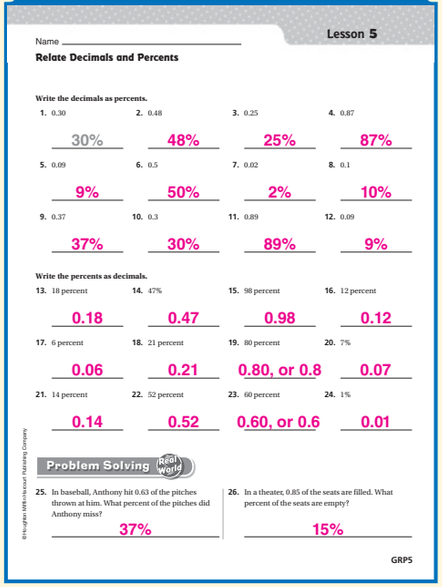
STEP 3 Use the model to write a decimal.
19 shaded squares out of 100 squares = **0.19**



Possible answer: The sale prices are half of the original prices.

Math Talk **Mathematical Practices**
Suppose a store is having a 50% off sale. What does this mean?

GR: Practice, p. GRP5



Name _____ Lesson 5

Relate Decimals and Percents

Write the decimals as percents.

1. 0.30	2. 0.48	3. 0.25	4. 0.87
30%	48%	25%	87%
5. 0.09	6. 0.5	7. 0.02	8. 0.1
9%	50%	2%	10%
9. 0.37	10. 0.3	11. 0.89	12. 0.09
37%	30%	89%	9%

Write the percents as decimals.

13. 18 percent	14. 47%	15. 98 percent	16. 12 percent
0.18	0.47	0.98	0.12
17. 6 percent	18. 21 percent	19. 80 percent	20. 7%
0.06	0.21	0.80, or 0.8	0.07
21. 14 percent	22. 52 percent	23. 60 percent	24. 1%
0.14	0.52	0.60, or 0.6	0.01

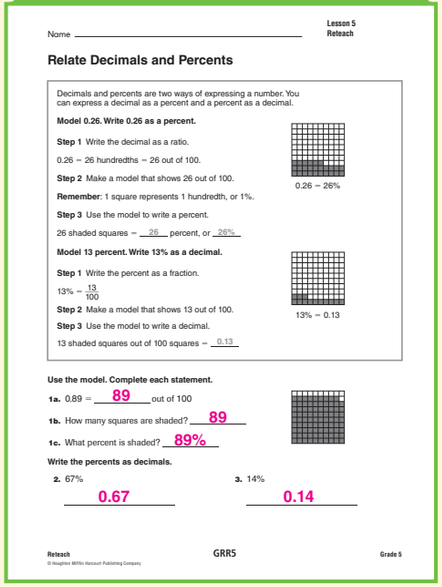
Problem Solving Real World

25. In baseball, Anthony hit 0.63 of the pitches thrown at him. What percent of the pitches did Anthony miss? **37%**

26. In a theater, 0.85 of the seats are filled. What percent of the seats are empty? **15%**

GRP5

GR: Reteach, p. GRR5



Name _____ Lesson 5 Reteach

Relate Decimals and Percents

Decimals and percents are two ways of expressing a number. You can express a decimal as a percent and a percent as a decimal.

Model 0.26. Write 0.26 as a percent.

Step 1 Write the decimal as a ratio.
0.26 = 26 hundredths = 26 out of 100.

Step 2 Make a model that shows 26 out of 100.

Remember: 1 square represents 1 hundredth, or 1%.

Step 3 Use the model to write a percent.
26 shaded squares = 26 percent, or 26%

0.26 = 26%

Model 13 percent. Write 13% as a decimal.

Step 1 Write the percent as a fraction.
13% = $\frac{13}{100}$

Step 2 Make a model that shows 13 out of 100.

Step 3 Use the model to write a decimal.
13 shaded squares out of 100 squares = 0.13

13% = 0.13

Use the model. Complete each statement.

1a. 0.89 = **89** out of 100

1b. How many squares are shaded? **89**

1c. What percent is shaded? **89%**

Write the percents as decimals.

2. 67%	3. 14%
0.67	0.14

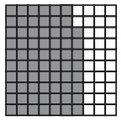
Reteach GRR5 Grade 5

***GR** – Getting Ready Lessons and Resources (*www.thinkcentral.com*)

Share and Show

MATH BOARD

Use the model. Complete each statement.



1a. 0.68 = 68 out of 100

1b. How many squares are shaded?

68

1c. What percent is shaded?

68%

Write the percents as decimals.

2. 47 percent

0.47

3. 11 percent

0.11

On Your Own

Write the decimals as percents.

4. 0.20

20%

5. 0.39

39%

6. 0.44

44%

7. 0.93

93%

8. 0.07

7%

9. 0.7

70%

10. 0.06

6%

11. 0.6

60%

Write the percents as decimals.

12. 12 percent

0.12

13. 31%

0.31

14. 99 percent

0.99

15. 13 percent

0.13

16. 4 percent

0.04

17. 14 percent

0.14

18. 90 percent

0.90, or 0.9

19. 9%

0.09

Problem Solving

Real World

20. In basketball, Linda made 0.56 of her shots. What percent of her shots did Linda miss?

44 percent

2 PRACTICE

MATH BOARD

Share and Show • Guided Practice

Encourage students to note the similarities and the differences between the equivalent decimals and percents. Point out the location of the decimal point in each number.

On Your Own • Independent Practice

Students may need to be reminded to not include the decimal point when writing each number as a percent.

Problem Solving

Math Processes and Practices

Encourage students to use 10 × 10 grids to make a model of the information to help them solve the problem.

3 SUMMARIZE

Math Processes and Practices

Essential Question

How can you express decimals as percents and percents as decimals? Possible answer: I can write the decimal as a fraction with 100 as the denominator, make a model that shows the number out of 100, and use the model to write a percent. I can write a percent as a fraction with 100 as the denominator and then write the fraction as a decimal.

Math Journal

WRITE Math

Explain how you know that 0.27 = 27%.

LESSON 6

Fractions, Decimals, and Percents

LESSON AT A GLANCE

Lesson Objective
Convert between fractions, decimals, and percents.

Materials
MathBoard

GO DIGITAL Animated Math Models

1 TEACH and TALK

GO DIGITAL • Animated Math Models

Unlock the Problem

Math Processes and Practices

Help students understand how to convert between fractions, decimals, and percents.

Tell students that fractions, decimals, and percents are similar.

Draw a 10 × 10 grid on the board and shade 23 squares. Elicit from students that this quantity can be expressed as 23 out of 100, 23%, 23 hundredths, 0.23, or $\frac{23}{100}$.

Read the problem aloud. Help students see that the first step is to convert $\frac{2}{5}$ to an equivalent fraction with 100 in the denominator. Then, help them rename $\frac{40}{100}$ as 0.4, or 40%.

- **Look at Example A. What is the first step to convert $\frac{8}{25}$ into a decimal?** Find an equivalent fraction with 100 as the denominator. **How can you do this?** Multiply the numerator and denominator by 4 to get $\frac{32}{100}$.

Use **Math Talk** to focus on students' understanding of writing percents as decimals.

This lesson builds on writing decimal notation for fractions presented in Grade 4, and prepares students for finding a percent of a quantity taught in Grade 6.

Name _____

Fractions, Decimals, and Percents

Essential Question How can you convert between fractions, decimals, and percents?

Unlock the Problem Real World

Every percent and decimal number can also be written as a fraction. All fractions can be written as decimals and percents. For example, $\frac{2}{5}$ of the songs in Bonnie's music collection are country songs. What percent of her song collection is country?

Write the percent that is equivalent to $\frac{2}{5}$.

STEP 1 Set up the equivalent fraction with a denominator of 100.

$\frac{2 \times ?}{5 \times ?} = \frac{}{100}$

STEP 2 Ask: By what factor can you multiply the denominator to get 100?

$\frac{2 \times ?}{5 \times 20} = \frac{}{100}$ ← multiply the denominator by 20

STEP 3 Multiply the numerator by the same factor, 20.

$\frac{2 \times 20}{5 \times 20} = \frac{40}{100}$

STEP 4 Write the fraction as a percent.

$\frac{40}{100} = \underline{40}$ percent

So, $\frac{2}{5}$ equals $\underline{40}$ percent.

More Examples

A. Write $\frac{8}{25}$ as a decimal.

STEP 1 Write an equivalent fraction with a denominator of 100.

$\frac{8 \times 4}{25 \times 4} = \frac{32}{100}$ ← multiply denominator and numerator by 4

STEP 2 Write the fraction as a decimal.

$\frac{32}{100} = 0.32$

B. Write 90 percent as a fraction in simplest form.

STEP 1 Write 90% as a fraction.

$90\% = \frac{90}{100}$

STEP 2 Simplify.

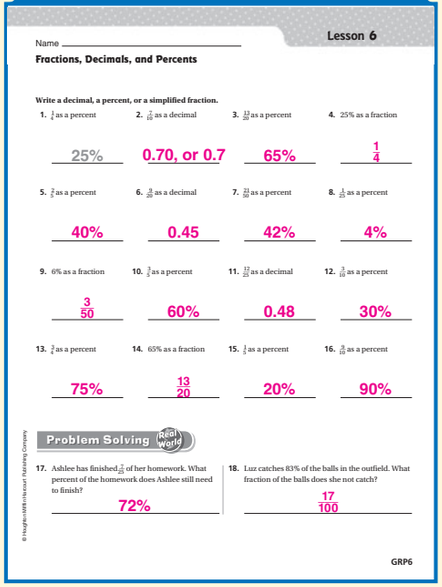
$90\% = \frac{90 \div 10}{100 \div 10} = \frac{9}{10}$

Math Talk Mathematical Practices

How are 9% and 90% alike when written as decimals? How are they different?

Possible answer: Alike: Both have the same digits. Different: They have different values and 9% has a 0 in the tenths place.

GR: Practice, p. GRP6



Name _____ Lesson 6

Fractions, Decimals, and Percents

Write a decimal, a percent, or a simplified fraction.

1. $\frac{1}{4}$ as a percent	2. $\frac{7}{10}$ as a decimal	3. $\frac{13}{20}$ as a percent	4. 25% as a fraction
25%	0.70, or 0.7	65%	$\frac{1}{4}$
5. $\frac{2}{5}$ as a percent	6. $\frac{9}{20}$ as a decimal	7. $\frac{21}{50}$ as a percent	8. $\frac{1}{25}$ as a percent
40%	0.45	42%	4%
9. 6% as a fraction	10. $\frac{3}{4}$ as a percent	11. $\frac{12}{25}$ as a decimal	12. $\frac{3}{10}$ as a percent
$\frac{3}{50}$	60%	0.48	30%
13. $\frac{3}{4}$ as a percent	14. 65% as a fraction	15. $\frac{1}{5}$ as a percent	16. $\frac{9}{10}$ as a percent
75%	$\frac{13}{20}$	20%	90%

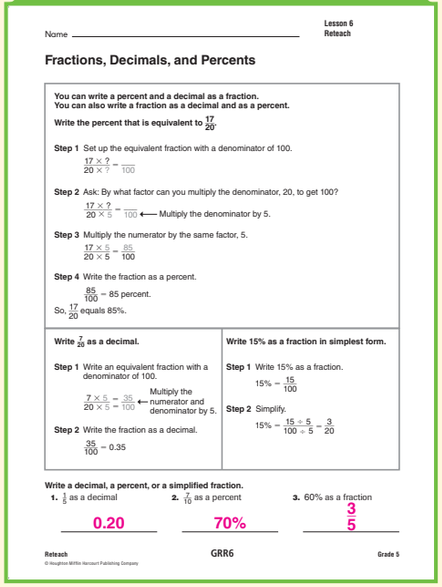
Problem Solving Real World

17. Ashlee has finished $\frac{7}{25}$ of her homework. What percent of the homework does Ashlee still need to finish? 72%

18. Luz catches 83% of the balls in the outfield. What fraction of the balls does she not catch? $\frac{17}{100}$

GRP6

GR: Reteach, p. GRR6



Name _____ Lesson 6 Reteach

Fractions, Decimals, and Percents

You can write a percent and a decimal as a fraction.
You can also write a fraction as a decimal and as a percent.

Write the percent that is equivalent to $\frac{17}{20}$.

Step 1 Set up the equivalent fraction with a denominator of 100.
$\frac{17 \times ?}{20 \times ?} = \frac{}{100}$

Step 2 Ask: By what factor can you multiply the denominator, 20, to get 100?
$\frac{17 \times ?}{20 \times 5} = \frac{}{100}$ ← Multiply the denominator by 5.

Step 3 Multiply the numerator by the same factor, 5.
$\frac{17 \times 5}{20 \times 5} = \frac{85}{100}$

Step 4 Write the fraction as a percent.
$\frac{85}{100} = 85$ percent.
So, $\frac{17}{20}$ equals 85%.

Write $\frac{7}{20}$ as a decimal.

Step 1 Write an equivalent fraction with a denominator of 100.
$\frac{7 \times 5}{20 \times 5} = \frac{35}{100}$ ← Multiply the numerator and denominator by 5.

Step 2 Write the fraction as a decimal.
$\frac{35}{100} = 0.35$

Write 15% as a fraction in simplest form.

Step 1 Write 15% as a fraction.
$15\% = \frac{15}{100}$

Step 2 Simplify.
$15\% = \frac{15 \div 5}{100 \div 5} = \frac{3}{20}$

Write a decimal, a percent, or a simplified fraction.

1. $\frac{1}{5}$ as a decimal	2. $\frac{7}{10}$ as a percent	3. 60% as a fraction
0.20	70%	$\frac{3}{5}$

Reteach

GRR6
Grade 5

*GR – Getting Ready Lessons and Resources (*www.thinkcentral.com*)

Share and Show

MATH BOARD

Complete the steps to write $\frac{7}{20}$ as a percent.

1. By what factor should you multiply the denominator and numerator? 5

$\frac{7 \times ?}{20 \times ?} = \frac{?}{100}$

2. For $\frac{7}{20}$, what is an equivalent fraction with a denominator of 100?

$\frac{35}{100}$

3. What percent is equivalent to $\frac{7}{20}$?

35%

Write a decimal, a percent, or a simplified fraction.

4. $\frac{1}{4}$ as a decimal — 0.25

5. $\frac{3}{10}$ as a percent — 30%

6. 80% as a fraction — $\frac{4}{5}$

On Your Own

Write a decimal, a percent, or a simplified fraction.

7. $\frac{1}{2}$ as a percent — 50%

8. $\frac{9}{10}$ as a decimal — 0.9, or 0.90

9. $\frac{11}{20}$ as a percent — 55%

10. 75% as a fraction — $\frac{3}{4}$

11. $\frac{3}{5}$ as a percent — 60%

12. $\frac{9}{25}$ as a decimal — 0.36

13. $\frac{29}{50}$ as a percent — 58%

14. $\frac{1}{20}$ as a percent — 5%

15. 4% as fraction — $\frac{1}{25}$

16. $\frac{4}{5}$ as a percent — 80%

17. $\frac{24}{25}$ as a decimal — 0.96

18. $\frac{41}{50}$ as a percent — 82%

Problem Solving

Real World

19. Whitney has finished $\frac{9}{20}$ of her book. What percent of the book does Whitney still need to read?

55%

20. Roger has completed $\frac{4}{25}$ of his math homework. What percent of his math homework does he still need to do?

84%

Getting Ready Lessons and Resources, pp. GR13–GR14

Checkpoint

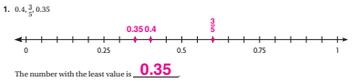
Name _____

Checkpoint

Concepts and Skills

Locate each number on the number line. Then complete the sentence.

1. 0.4, $\frac{3}{5}$, 0.35



The number with the least value is 0.35.

Write the numbers in order from least to greatest.

2. 0.4, $\frac{3}{5}$, 0.55, $\frac{1}{4}$ — $\frac{1}{4}$, 0.4, 0.55, $\frac{3}{5}$

3. $\frac{3}{4}$, 0.7, $\frac{1}{2}$, 0.1 — 0.1, $\frac{1}{2}$, 0.7, $\frac{3}{4}$

Use a factor tree to find the prime number factors.

4. 16 — $2 \times 2 \times 2 \times 2$

5. 36 — $2 \times 2 \times 3 \times 3$

6. 42 — $2 \times 3 \times 7$

Write a decimal, a percent, or a simplified fraction.

7. 0.08 as a percent — 8%

8. $\frac{3}{5}$ as a decimal — 0.6, or 0.60

9. 80% as a fraction — $\frac{4}{5}$

10. $\frac{13}{20}$ as a percent — 65%

Problem Solving

Real World

For 11–12, use the data in the table.

Apes in the Wild Country Zoo	
Species	Number
Bonobo	4
Chimpanzee	20
Gorilla	15
Orangutan	11
Total	50

11. What percent of the apes in the Wild Country Zoo are orangutans? 22%

12. One species makes up 40% of the apes in the zoo. Which species is it? chimpanzees

Fill in the bubble or grid completely to show your answer.

13. Entries for the Lake Manatee Bass Fishing Contest are shown. First place is awarded to the contestant with the heaviest fish.

Lake Manatee Bass Contest	
Contestant	Weight of fish caught
George	6.25 pounds
Mia	$6\frac{2}{5}$ pounds
Harvey	$6\frac{1}{2}$ pounds

What is the correct order from first place to third place?

Ⓐ First: George, Second: Mia, Third: Harvey
Ⓑ First: Mia, Second: George, Third: Harvey
● First: Mia, Second: Harvey, Third: George
Ⓓ First: Harvey, Second: Mia, Third: George

14. Ric used a factor tree to write 100 as a product of factors that are prime numbers. How many factors were in Ric's product?

Ⓐ 2
Ⓑ 3
Ⓒ 4
● 5

15. On Monday, 6% of the students at Riverside School were absent. Written as a decimal, what portion of Riverside's students attended school that day?

Ⓐ 0.06
Ⓑ 0.6
● 0.94
Ⓓ 9

16. The Hastings family drove $\frac{12}{25}$ of the distance to Yellowstone National Park on the first day of their vacation. What percent of the distance to the park remained for them to drive?

Ⓐ 12%
Ⓒ 48%
Ⓑ 13%
● 52%

2 PRACTICE

MATH BOARD

Share and Show • Guided Practice

Remind students for each given fraction, they will need to first write an equivalent fraction with a denominator of 100 to write an equivalent decimal or percent.

On Your Own • Independent Practice

Students should realize that once they write an equivalent fraction with 100 as the denominator, the numerator is used to write the percent.

Problem Solving Math Processes and Practices

For Exercise 19, show students how to break the problem down into steps. One way is to first find the amount remaining ($\frac{11}{20}$) and then convert this number to a fraction with a denominator of 100, $\frac{55}{100}$. Then write this number as a percent (55%).

3 SUMMARIZE

Math Processes and Practices

Essential Question

How can you convert between fractions, decimals, and percents? Possible answer: To convert a fraction to a percent, write an equivalent fraction with a denominator of 100. Then I write the digits of the numerator followed by the percent symbol. To write a percent as a fraction, I take the digits in the front of the percent symbol and make them the numerator with a denominator of 100.

Math Journal WRITE Math

Explain how to write $\frac{3}{10}$ as a decimal and as a percent.

LESSON 7

Divide Fractions by a Whole Number

LESSON AT A GLANCE

Lesson Objective
Divide a fraction by a whole number.

Materials
MathBoard

This lesson builds on fraction and whole-number division presented in Chapter 8 and prepares students to divide fractions by fractions taught in Grade 6.

1 TEACH and TALK

Unlock the Problem

Math Processes and Practices

Help students understand how the model represents the problem.

- **Explain what the model represents in Step 1.** The rectangle represents 1 quart of ice cream. It is divided into thirds and two of the thirds are shaded to represent $\frac{2}{3}$ of 1 quart.
- **Explain what the model represents in Step 2.** Possible answer: The thirds are divided into fourths to represent the amount each friend gets.
- **How do you know the answer is $\frac{1}{6}$?** Two of the 12 equal sections are shaded twice, and $\frac{2}{12} = \frac{1}{6}$.

Use **Math Talk** to focus on students' understanding of modeling division of fractions.

Try This!

- **Write a related multiplication problem to find $\frac{3}{4} \div 2$.** $\frac{3}{4} \div 2 = \frac{3}{4} \times \frac{1}{2} = \frac{3}{8}$

Name _____

Divide Fractions by a Whole Number

Essential Question How do you divide a fraction by a whole number?

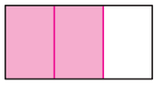
Unlock the Problem (Real World)

Four friends share $\frac{2}{3}$ of a quart of ice cream equally. What fraction of a quart of ice cream does each friend get?

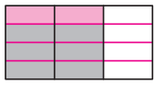
- What operation will you use to solve the problem? **division**

Divide. $\frac{2}{3} \div 4$

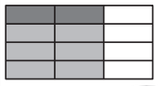
STEP 1
Let the rectangle represent 1 quart of ice cream. Divide it into thirds by drawing vertical lines. Shade 2 of the thirds.



STEP 2
Divide the rectangle into fourths by drawing horizontal lines. Shade $\frac{1}{4}$ of the $\frac{2}{3}$ already shaded.



STEP 3
The rectangle is now divided into **12** equal parts. Each part is **$\frac{1}{12}$** of the rectangle. Of the 12 equal parts, **2** parts are shaded twice. So, **$\frac{2}{12}$, or $\frac{1}{6}$** of the rectangle is shaded twice.



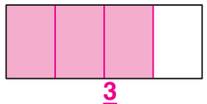
So, each friend gets **$\frac{2}{12}$, or $\frac{1}{6}$** of a quart of ice cream.

Math Talk — **Mathematical Practices**
Explain why you divided the rectangle into fourths in Step 2.

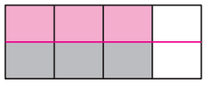
Possible expanation: The $\frac{2}{3}$ quart is being shared equally among 4 friends.

Try This! **Divide.** $\frac{3}{4} \div 2$

STEP 1
Divide the rectangle into fourths. Shade 3 of the fourths.



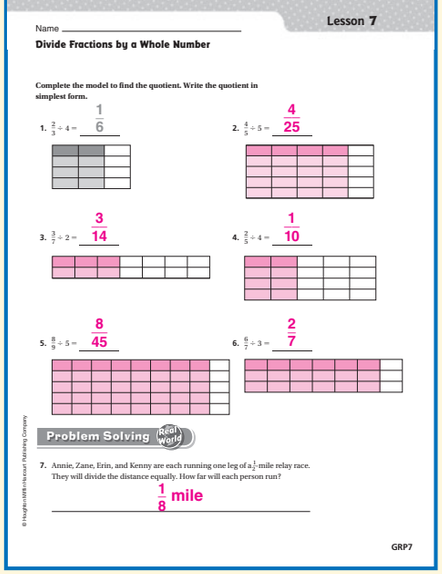
STEP 2
Divide the rectangle into halves. Shade $\frac{1}{2}$ of the $\frac{3}{4}$ already shaded.



STEP 3
Of the 8 equal parts, **3** parts are shaded twice. So, **$\frac{3}{8}$** of the rectangle is shaded twice.

So, $\frac{3}{4} \div 2 =$ **$\frac{3}{8}$**.

GR: Practice, p. GRP7



Name _____ Lesson 7

Divide Fractions by a Whole Number

Complete the model to find the quotient. Write the quotient in simplest form.

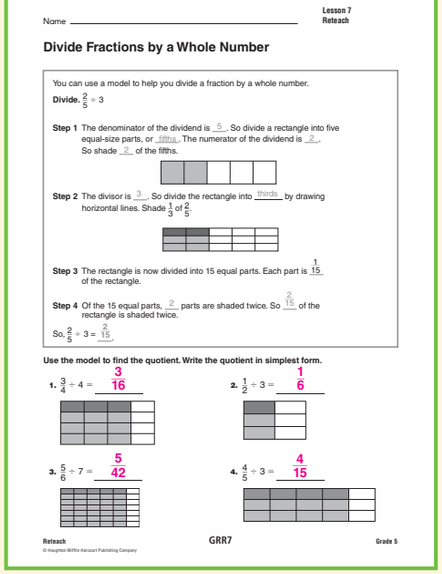
1. $\frac{2}{3} \div 4 =$ **$\frac{1}{6}$**
2. $\frac{4}{5} \div 5 =$ **$\frac{4}{25}$**
3. $\frac{3}{7} \div 2 =$ **$\frac{3}{14}$**
4. $\frac{2}{5} \div 4 =$ **$\frac{1}{10}$**
5. $\frac{8}{9} \div 5 =$ **$\frac{8}{45}$**
6. $\frac{6}{7} \div 3 =$ **$\frac{2}{7}$**

Problem Solving (Real World)

7. Annie, Zane, Erin, and Kenny are each running one leg of a $\frac{1}{2}$-mile relay race. They will divide the distance equally. How far will each person run?
$\frac{1}{8}$ mile

GRP7

GR: Reteach, p. GRR7



Name _____ Lesson 7 Reteach

Divide Fractions by a Whole Number

You can use a model to help you divide a fraction by a whole number.

Divide. $\frac{2}{5} \div 3$

Step 1 The denominator of the dividend is 5. So divide a rectangle into five equal-size parts, or fifths. The numerator of the dividend is 2. So shade 2 of the fifths.

Step 2 The divisor is 3. So divide the rectangle into thirds by drawing horizontal lines. Shade $\frac{1}{3}$ of $\frac{2}{5}$.

Step 3 The rectangle is now divided into 15 equal parts. Each part is $\frac{1}{15}$ of the rectangle.

Step 4 Of the 15 equal parts, 2 parts are shaded twice. So $\frac{2}{15}$ of the rectangle is shaded twice.

So, $\frac{2}{5} \div 3 = \frac{2}{15}$

Use the model to find the quotient. Write the quotient in simplest form.

1. $\frac{3}{4} \div 4 =$ **$\frac{3}{16}$**
2. $\frac{1}{2} \div 3 =$ **$\frac{1}{6}$**
3. $\frac{5}{6} \div 7 =$ **$\frac{5}{42}$**
4. $\frac{4}{5} \div 3 =$ **$\frac{4}{15}$**

Reteach

GRR7

Grade 5

*GR – Getting Ready Lessons and Resources (*www.thinkcentral.com*)

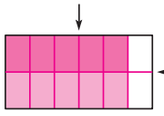
Share and Show

MATH BOARD

Complete the model to find the quotient. Write the quotient in simplest form.

1. $\frac{5}{6} \div 2 =$ $\frac{5}{12}$

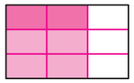
Divide the rectangle into sixths.
Shade 5 of the sixths.



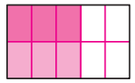
Divide the rectangle into halves. Shade $\frac{1}{2}$ of $\frac{5}{6}$.

2. $\frac{3}{4} \div 3 =$ $\frac{1}{4}$

3. $\frac{2}{3} \div 3 =$ $\frac{2}{9}$



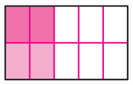
4. $\frac{3}{5} \div 2 =$ $\frac{3}{10}$



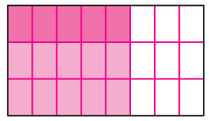
On Your Own

Complete the model to find the quotient. Write the quotient in simplest form.

5. $\frac{2}{5} \div 2 =$ $\frac{1}{5}$



6. $\frac{5}{8} \div 3 =$ $\frac{5}{24}$



Draw a model to find the quotient. Write the quotient in simplest form. Check students' models.

7. $\frac{4}{9} \div 2 =$ $\frac{2}{9}$

8. $\frac{4}{5} \div 3 =$ $\frac{4}{15}$

Problem Solving

Real World

9. Heather, Jocelyn, and Dane are each swimming one leg of a $\frac{9}{10}$ mile race. They will divide the distance equally. How far will each team member swim?

$\frac{3}{10}$ mile

2 PRACTICE

MATH BOARD

Share and Show • Guided Practice

For Exercise 2, encourage students to plan their solution using the steps in Exercise 1 as a model. First, they should shade 3 of 4 fourths in one direction. Then they should shade 1 of 3 thirds in the other direction.

On Your Own • Independent Practice

For Exercises 7–8, have students use a sheet of paper to draw a model to find the quotient. Before solving, have students describe the steps that they would take to draw a model to find the quotient for Exercise 7.

Problem Solving Math Processes and Practices

Since there are 3 swimmers, students should model $\frac{9}{10} \div 3$ to solve the problem.

3 SUMMARIZE

Math Processes and Practices

Essential Question

How do you divide a fraction by a whole number? Possible answer: I would draw a rectangle, model the dividend by drawing and shading columns, and then divide the rectangle into the same number of rows as the number in the divisor. Then double shade that part of the dividend.

Math Journal WRITE Math

Explain how you can find the quotient $\frac{7}{8} \div 3$.

LESSON 8

Ratios

LESSON AT A GLANCE

Lesson Objective
Express real world quantities as ratios.

Vocabulary
ratio

Materials
MathBoard, two-color counters

GO DIGITAL Animated Math Models

1 TEACH and TALK

GO DIGITAL • Animated Math Models

Unlock the Problem

Math Processes and Practices

Write the term *ratio* on the board. Tell students that a ratio is a comparison of two numbers. Distribute counters to students.

Activity

Read the problem aloud. Have students show the ratio 3:2 with 3 yellow counters and 2 red counters.

Show students how to read the ratio from left to right. Help them say aloud, "The ratio of yellow counters to red counters is 3 to 2."

- **What is the ratio of red counters to yellow counters?** 2:3

Try This!

- Show 2 yellow counters and 5 red counters. Use the counters to show a ratio of red counters to the total number of counters. **What ratio can you write to represent this?** 5:7
- **Think about ratios in the real world that you could describe. What is the ratio of boys to girls in this classroom? What is the ratio of desks to chairs?** Answers will vary.

Use Math Talk to focus on students' understanding of ratios.

This lesson builds on fraction understanding presented in Grade 3, and prepares students for understanding ratios taught in Grade 6.

Name _____

Ratios

Essential Question How can you express real world quantities as ratios?

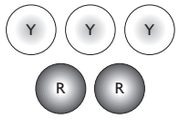
Unlock the Problem Real World

Max sells bouquets of roses. There are 3 yellow roses and 2 red roses. What is the ratio of yellow to red roses?

A ratio is a comparison of two numbers.

- A ratio is expressed by comparing one part to another, such as 4 feet to 20 toes, or 3 yellow roses to **2 red roses**.

Activity **Materials** ■ two-color counters



Model the data.

STEP 1 Use 3 counters with the yellow side up to represent yellow roses and 2 counters with the red side up to represent red roses.

STEP 2 Write the ratio of yellow to red roses.

- Ratios can be written in different ways.

3 to 2 or 3:2 or $\frac{3}{2}$ (as a fraction)

So, the ratio of yellow roses to red roses is **3 to 2**, **3:2**, or $\frac{3}{2}$.

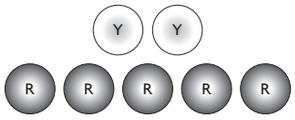
In the example above, you compared a part to a part. You can also use a ratio to compare a part to a whole or a whole to a part.

Try This! **Show a ratio of red counters to total counters.**

STEP 1 Count to find the number of red counters. **5**

STEP 2 Count to find the total number of counters. **7**

STEP 3 Write the ratio. **5 to 7, 5:7, $\frac{5}{7}$.**

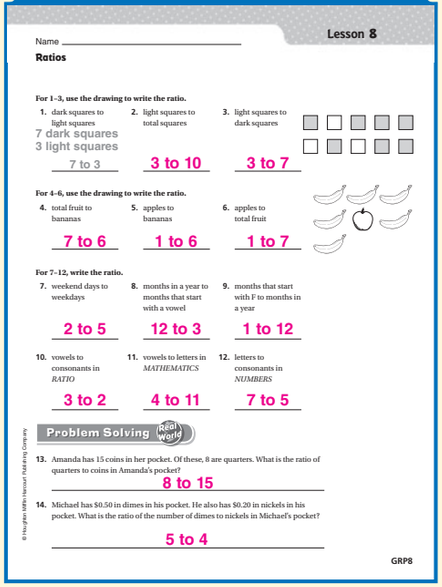


Math Talk Mathematical Practices

How would the ratio change if you found the ratio of total counters to red counters?

The numbers would be reversed. The ratio would be 7 to 5, 7:5, or $\frac{7}{5}$.

GR: Practice, p. GRP8



Name _____ Lesson 8

Ratios

For 1–3, use the drawing to write the ratio.

1. dark squares to light squares: 7 dark squares, 3 light squares — 7 to 3
2. light squares to total squares — 3 to 10
3. light squares to dark squares — 3 to 7

For 4–6, use the drawing to write the ratio.

4. total fruit to bananas — 7 to 6
5. apples to bananas — 1 to 6
6. apples to total fruit — 1 to 7

For 7–12, write the ratio.

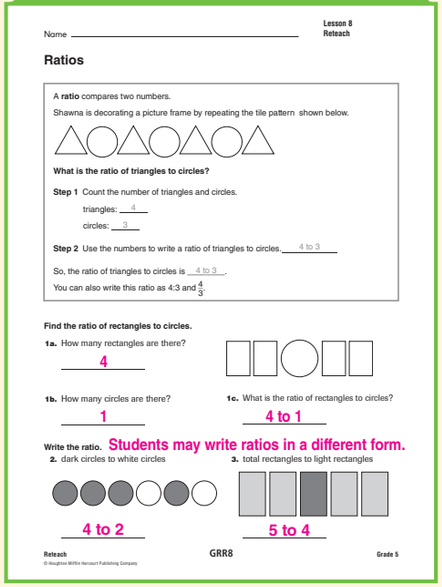
7. weekend days to weekdays — 2 to 5
8. months in a year to months that start with a vowel — 12 to 3
9. months that start with F to months in a year — 1 to 12
10. vowels to consonants in *RATIO* — 3 to 2
11. vowels to letters in *MATHEMATICS* — 4 to 11
12. letters to consonants in *NUMBERS* — 7 to 5

Problem Solving Real World

13. Amanda has 15 coins in her pocket. Of these, 8 are quarters. What is the ratio of quarters to coins in Amanda's pocket? — 8 to 15
14. Michael has $0.50 in dimes in his pocket. He also has $0.20 in nickels in his pocket. What is the ratio of the number of dimes to nickels in Michael's pocket? — 5 to 4

GRP8

GR: Reteach, p. GRR8



Name _____ Lesson 8 Reteach

Ratios

A **ratio** compares two numbers.

Shawna is decorating a picture frame by repeating the tile pattern shown below.

What is the ratio of triangles to circles?

Step 1 Count the number of triangles and circles.

triangles: 4

circles: 3

Step 2 Use the numbers to write a ratio of triangles to circles. 4 to 3

So, the ratio of triangles to circles is 4 to 3.

You can also write this ratio as 4:3 and $\frac{4}{3}$.

Find the ratio of rectangles to circles.

1a. How many rectangles are there? 4

1b. How many circles are there? 1

1c. What is the ratio of rectangles to circles? 4 to 1

Write the ratio. Students may write ratios in a different form.

2. dark circles to white circles — 4 to 2

3. total rectangles to light rectangles — 5 to 4

Reteach

GRR8

Grade 5

*GR – Getting Ready Lessons and Resources (*www.thinkcentral.com*)

Share and Show

Find the ratio of red counters to yellow counters.

1a. How many red counters are there?

4

1b. How many yellow counters are there?

3

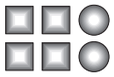
1c. What is the ratio of red to yellow counters?

4 to 3, 4:3, or $\frac{4}{3}$

Write the ratio.

Students may write ratios in a different form.

2. squares to circles



4 to 2

3. total squares to dark squares

9 to 7

On Your Own

Students may write ratios in a different form.

For 4–6, use the drawing to write the ratio.

4. dark to light

5 to 3

5. light to dark

3 to 5

6. light to total

3 to 8

For 7–9, use the drawing to write the ratio.

7. triangles to circles

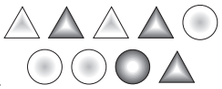
5 to 4

8. dark to light

4 to 5

9. total shapes to circles

9 to 4



For 10–12, write the ratio.

10. weekdays to weekend days

5 to 2

11. weekend days to days in a week

2 to 7

12. days in a week to days in January

7 to 31

Problem Solving

13. The ratio of length to width in Gus's driveway is 13 yards to 4 yards. What is this ratio in feet? (Hint: 3 ft = 1 yd)

39 feet to 12 feet

2 PRACTICE

Share and Show • Guided Practice

Encourage students to say each ratio aloud, and reinforce the fact that they should read ratios from left to right.

On Your Own • Independent Practice

Students may write the ratios for Exercises 4–12 in different ways. For example, the ratio of 4 to 3 can also be written as 4:3, or $\frac{4}{3}$.

Problem Solving

Math Processes and Practices

Have students draw a diagram of the driveway on a sheet of paper to help them solve the problem. Remind them to show their work as they convert yards to feet.

3 SUMMARIZE

Math Processes and Practices

Essential Question

How can you express real world quantities as ratios? Possible answer: A ratio of the number *a* to the number *b* can be expressed as *a* to *b*, $\frac{a}{b}$, or *a*:*b*. The positions of *a* and *b* are based on the order that they are compared.

Math Journal

Look at your classmates and write a ratio comparing the number of light-haired students to the total number of students. Now, write a ratio comparing the number of dark-haired students to the total number of students. What do you notice about the two ratios?

LESSON 9

Equivalent Ratios

LESSON AT A GLANCE

Lesson Objective
Determine if two ratios are equivalent.

Materials
MathBoard

GO DIGITAL Animated Math Models

1 TEACH and TALK

GO DIGITAL • Animated Math Models

Unlock the Problem

Math Processes and Practices

Review the meanings of the terms *equivalent* and *ratio*. Tell students that an equivalent ratio is similar to an equivalent fraction—it is equal to the original ratio.

Read the problem aloud. Show students how to draw a diagram that represents the ratio 2:3. Then demonstrate how to use equivalent fractions to find the answer.

- **What factor can you multiply 3 by to get 12?** 4 **How can you use this information to solve the problem?** If you multiply the denominator by 4, then you have to multiply the numerator by 4.
- **What is the equivalent ratio?** The ratio 2 to 3 is equivalent to 8 to 12.

Try This!

- **Look at 6:8 and 18:24. What fraction do you get when you simplify $\frac{6}{8}$? $\frac{3}{4}$ What fraction do you get when you simplify $\frac{18}{24}$? $\frac{3}{4}$ How can you use this information to solve the problem?** If both ratios simplify to the same fraction, then they are equivalent.

This lesson builds on writing equivalent fractions presented in Grade 4, and prepares students for writing equivalent ratios taught in Grade 6.

Name _____

Equivalent Ratios

Essential Question How can you determine if two ratios are equivalent?

Unlock the Problem Real World

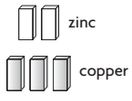
To make brass, you can mix 2 parts zinc to 3 parts copper, a ratio of 2 to 3. If you have 12 bars of copper and use them all, how many bars of zinc do you need to make brass?

- You know that each group of zinc to copper bars needed to make brass has a ratio of 2 to 3. How can you use this group to find an equivalent ratio?

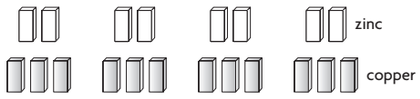
Since ratios can be written as fractions, 2 to 3 can be written as $\frac{2}{3}$. Use what you know about equivalent fractions to find equivalent ratios.

Use a diagram to find an equivalent ratio.

STEP 1 Draw bars to represent a 2 to 3 ratio of zinc to copper.



STEP 2 Add groups until you have 12 bars of copper.



STEP 3 Count the zinc bars. Write an equivalent ratio.

There are 8 zinc bars. So, 2 to 3 is equivalent to the ratio 8 to 12.

Possible answer: Add equivalent groups. Since each group has the same ratio of 2 zinc bars to 3 copper bars, the sum will also have a 2 to 3 ratio.

Try This! **Use equivalent ratios to find out if 6:8 is equivalent to 18:24.**

STEP 1 Write the ratios as fractions.

$6:8 = \frac{6}{8}$ $18:24 = \frac{18}{24}$

STEP 2 Write the fractions in simplest form. Then compare.

$\frac{6 \div 2}{8 \div 2} = \frac{3}{4}$ $\frac{18 \div 6}{24 \div 6} = \frac{3}{4}$

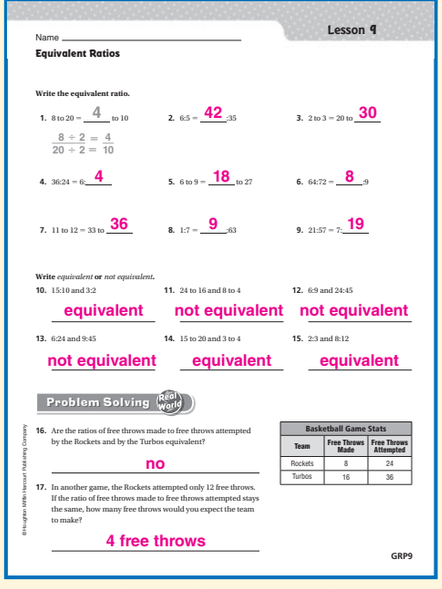
Both ratios equal $\frac{3}{4}$, so they are equivalent.

Possible answer: Ratios can be written as fractions. So, by writing the fractions in simplest form, I can compare them to see if they are equivalent.

Math Talk Mathematical Practices

How does knowing how to simplify fractions help you decide whether two ratios are equivalent?

GR: Practice, p. GRP9



Name _____ Lesson 9

Equivalent Ratios

Write the equivalent ratio.

1. 8 to 20 = 4 to 10 (8 ÷ 2 = 4, 20 ÷ 2 = 10)
2. 6:5 = 42:35
3. 2 to 3 = 20 to 30
4. 36:24 = 6:4
5. 6 to 9 = 18 to 27
6. 64:72 = 8:9
7. 11 to 12 = 33 to 36
8. 1:7 = 9:63
9. 21:57 = 7:19

Write *equivalent* or *not equivalent*.

10. 15:10 and 3:2 — equivalent
11. 24 to 16 and 8 to 4 — not equivalent
12. 6:9 and 24:45 — not equivalent
13. 6:24 and 9:45 — not equivalent
14. 15 to 20 and 3 to 4 — equivalent
15. 2:3 and 8:12 — equivalent

Problem Solving Real World

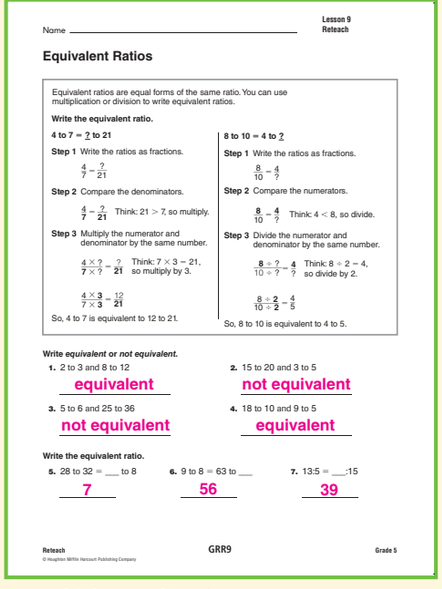
16. Are the ratios of free throws made to free throws attempted by the Rockets and by the Turbos equivalent? — no

Basketball Game Stats		
Team	Free Throws Made	Free Throws Attempted
Rockets	8	24
Turbos	16	36

17. In another game, the Rockets attempted only 12 free throws. If the ratio of free throws made to free throws attempted stays the same, how many free throws would you expect the team to make? — 4 free throws

GRP9

GR: Reteach, p. GRR9



Name _____ Lesson 9 Reteach

Equivalent Ratios

Equivalent ratios are equal forms of the same ratio. You can use multiplication or division to write equivalent ratios.

Write the equivalent ratio.

4 to 7 = ? to 21

Step 1 Write the ratios as fractions. $\frac{4}{7} = \frac{?}{21}$

Step 2 Compare the denominators. $\frac{4}{7} = \frac{?}{21}$ Think: 21 > 7, so multiply.

Step 3 Multiply the numerator and denominator by the same number. $\frac{4 \times ?}{7 \times ?} = \frac{?}{21}$ Think: 7 × 3 = 21, so multiply by 3. $\frac{4 \times 3}{7 \times 3} = \frac{12}{21}$

So, 4 to 7 is equivalent to 12 to 21.

8 to 10 = 4 to ?

Step 1 Write the ratios as fractions. $\frac{8}{10} = \frac{4}{?}$

Step 2 Compare the numerators. $\frac{8}{10} = \frac{4}{?}$ Think: 4 < 8, so divide.

Step 3 Divide the numerator and denominator by the same number. $\frac{8 \div ?}{10 \div ?} = \frac{4}{?}$ Think: 8 ÷ 2 = 4, so divide by 2. $\frac{8 \div 2}{10 \div 2} = \frac{4}{5}$

So, 8 to 10 is equivalent to 4 to 5.

Write *equivalent* or *not equivalent*.

1. 2 to 3 and 8 to 12 — equivalent
2. 15 to 20 and 3 to 5 — not equivalent
3. 5 to 6 and 25 to 36 — not equivalent
4. 18 to 10 and 9 to 5 — equivalent

Write the equivalent ratio.

5. 28 to 32 = ___ to 8 — 7
6. 9 to 8 = 63 to ___ — 56
7. 13:5 = ___:15 — 39

Reteach GRR9 Grade 5

*GR – Getting Ready Lessons and Resources (*www.thinkcentral.com*)

Share and Show

Are the ratios 3:5 and 12:20 equivalent?

1a. Write both ratios as fractions.

$\frac{3}{5}, \frac{12}{20}$

1b. Are both ratios in simplest form?

no

1c. Write both ratios in simplest form.

$\frac{3}{5}, \frac{3}{5}$

1d. Are the ratios equivalent?

yes

Write *equivalent* or *not equivalent*.

2. 1 to 3 and 2 to 6

equivalent

3. 3 to 7 and 12 to 21

not equivalent

On Your Own

Write the equivalent ratio.

4. 5 to 2 = 10 to 4

5. 3 to 6 = 7 to 14

6. 7:2 = 21:6

7. 14 to 21 = 10 to 15

8. 6:10 = 18:30

9. 8 to 9 = 40 to 45

Write *equivalent* or *not equivalent*.

10. 3:5 and 21:35

equivalent

11. 4 to 3 and 36 to 24

not equivalent

12. 27:72 and 9:24

equivalent

Problem Solving

13. Three of every 5 pizzas that Miggy's Pizza sells are cheese pizzas. Miggy's sold 80 pizzas today. How many of them would you expect were cheese?

48 pizzas

2 PRACTICE

Share and Show • Guided Practice

Help students write out each ratio as fractions. Encourage them to use the terms *numerator, denominator, equivalent*, and *ratio* as they compare the ratios.

On Your Own • Independent Practice

Students may need reminders to read each ratio from left to right in order to make sure they set up their equivalent fractions correctly.

Problem Solving

Math Processes and Practices

Have students work in small groups to draw diagrams that will help them solve the problem. Have students show the equivalent fractions that helped them find the correct answer.

3 SUMMARIZE

Math Processes and Practices

Essential Question

How can you determine if two ratios are equivalent? Possible answer: If two ratios written as fractions in simplest form are equal, then the two ratios are equivalent.

Math Journal

A cookie recipe uses 2 cups of flour to make 60 cookies. Marlis needs to bake 180 cookies for a bake sale. How much flour will she need? Show your work.

LESSON 10

Rates

LESSON AT A GLANCE

Lesson Objective
Find rates and unit rates.

Vocabulary
rate, unit rate

Materials
MathBoard

GO DIGITAL Animated Math Models

1 TEACH and TALK

GO DIGITAL • Animated Math Models

Unlock the Problem

Math Processes and Practices

Review the meaning of a ratio by asking the students to give some examples of ratios. Then ask students if they have ever heard of the term rate. Have them give examples of a rate.
Possible answers: rate of speed, heart rate, rate of pay

Have students read the introductory paragraph.

- **How does a rate differ from a ratio?**
  Possible answer: A rate compares two quantities measured in different units.
- **How does a unit rate differ from a rate?**
  Possible answer: The second term in a unit rate is 1.

Have students read the problem.

- **What are the words in the problem that help you to write the rate?** 4 CDs for $12
- **How can you write the unit rate?**
  Possible answer: Write an equivalent fraction with a denominator of 1.

Use Math Talk to check students' understanding of rates and unit rates.

This lesson builds on writing equivalent fractions presented in Grade 4, and prepares students for understanding unit rates taught in Grade 6.

Name _____

Rates

Essential Question How can you find rates and unit rates?

Unlock the Problem Real World

CONNECT You know how to write ratios to compare two quantities. A **rate** is a ratio that compares two quantities that have different units of measure. A **unit rate** is a rate that has 1 unit as its second term.

Rafael is shopping at a used book and music store. A sign advertises 4 CDs for $12. What is the unit rate for the cost of 1 CD?

- What are the units of the quantities that are being compared?
  dollars and CDs
- What operations can you use to write equivalent ratios?
  multiplication and division

Write the rate in fraction form. Then find the unit rate.

STEP 1

Write the rate in fraction form to compare dollars to CDs.

$\frac{\text{dollars}}{\text{CDs}} \rightarrow \frac{12}{4}$

STEP 2

Divide to find an equivalent rate so that 1 is the second term.

$\frac{12}{4} = \frac{12 \div 4}{4 \div 4} = \frac{3}{1}$ ← unit rate

So, the unit rate for CDs is $3 for 1 CD.

No; Possible explanation: The unit rate is $\frac{1}{3}$ CD for $1; you cannot buy part of a CD.

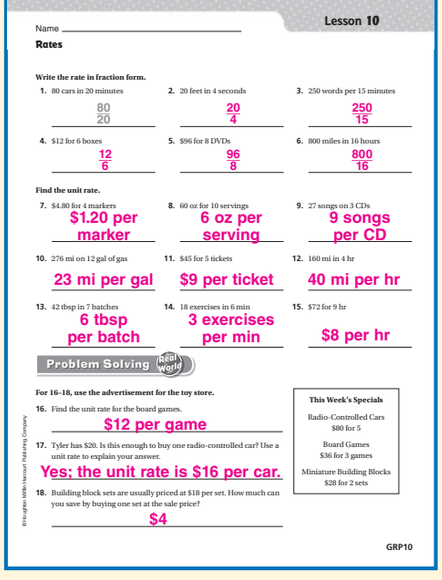
Math Talk Mathematical Practices

Would it make sense to compare CDs to dollars to find a unit rate? **Explain.**

- **What if** the regular price of CDs is 5 for $20? What is the unit rate for CDs at the regular price? **Explain** how you found your answer.

$4 for 1 CD; Possible explanation: The rate is $\frac{20}{5}$. I divided the numerator and denominator by 5 to find the unit rate.

GR: Practice, p. GRP10



Name _____ Lesson 10

Rates

Write the rate in fraction form.

1. 80 cars in 20 minutes — $\frac{80}{20}$
2. 20 feet in 4 seconds — $\frac{20}{4}$
3. 250 words per 15 minutes — $\frac{250}{15}$
4. $12 for 6 boxes — $\frac{12}{6}$
5. $96 for 8 DVDs — $\frac{96}{8}$
6. 800 miles in 16 hours — $\frac{800}{16}$

Find the unit rate.

7. $4.80 for 4 markers — $1.20 per marker
8. 60 oz for 10 servings — 6 oz per serving
9. 27 songs on 3 CDs — 9 songs per CD
10. 276 mi on 12 gal of gas — 23 mi per gal
11. $45 for 5 tickets — $9 per ticket
12. 160 mi in 4 hr — 40 mi per hr
13. 42 tbsp in 7 batches — 6 tbsp per batch
14. 18 exercises in 6 min — 3 exercises per min
15. $72 for 9 hr — $8 per hr

Problem Solving Real World

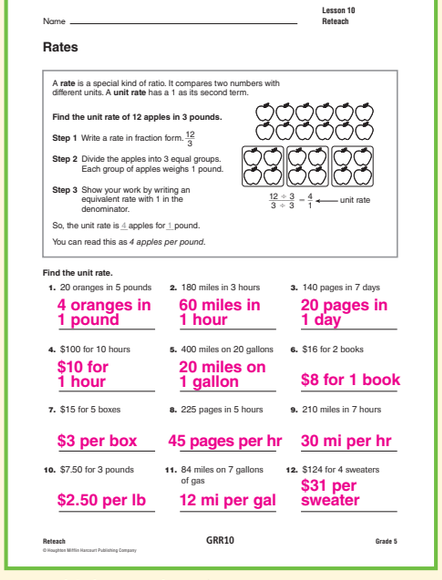
For 16–18, use the advertisement for the toy store.

This Week's Specials
Radio-Controlled Cars $80 for 5
Board Games $36 for 3 games
Miniature Building Blocks $28 for 2 sets

16. Find the unit rate for the board games. — $12 per game
17. Tyler has $20. Is this enough to buy one radio-controlled car? Use a unit rate to explain your answer. — Yes; the unit rate is $16 per car.
18. Building block sets are usually priced at $18 per set. How much can you save by buying one set at the sale price? — $4

GRP10

GR: Reteach, p. GRR10



Name _____ Lesson 10 Reteach

Rates

A **rate** is a special kind of ratio. It compares two numbers with different units. A **unit rate** has a 1 as its second term.

Find the unit rate of 12 apples in 3 pounds.

Step 1 Write a rate in fraction form. $\frac{12}{3}$

Step 2 Divide the apples into 3 equal groups. Each group of apples weighs 1 pound.

Step 3 Show your work by writing an equivalent rate with 1 in the denominator. $\frac{12 \div 3}{3 \div 3} = \frac{4}{1}$ ← unit rate

So, the unit rate is 4 apples for 1 pound.

You can read this as *4 apples per pound.*

Find the unit rate.

1. 20 oranges in 5 pounds — 4 oranges in 1 pound
2. 180 miles in 3 hours — 60 miles in 1 hour
3. 140 pages in 7 days — 20 pages in 1 day
4. $100 for 10 hours — $10 for 1 hour
5. 400 miles on 20 gallons — 20 miles on 1 gallon
6. $16 for 2 books — $8 for 1 book
7. $15 for 5 boxes — $3 per box
8. 225 pages in 5 hours — 45 pages per hr
9. 210 miles in 7 hours — 30 mi per hr
10. $7.50 for 3 pounds — $2.50 per lb
11. 84 miles on 7 gallons of gas — 12 mi per gal
12. $124 for 4 sweaters — $31 per sweater

Reteach GRR10 Grade 5

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Share and Show

1. Find the unit rate of speed for 120 miles in 2 hours.

$$\frac{\text{miles}}{\text{hours}} \quad \frac{120}{2} = \frac{120 \div 2}{2 \div 2} = \frac{60}{1}$$

The unit rate of speed is 60 miles per 1 hour.

Find the unit rate.

2. $5.00 for 2 T-shirts
   $2.50 per T-shirt
3. 200 words in 4 min
   50 words per min
4. 150 mi on 10 gal of gas
   15 mi per gal

On Your Own

Write the rate in fraction form.

5. 90 words in 2 min
   $\frac{90}{2}$
6. $1.20 for 6 goldfish
   $\frac{1.20}{6}$
7. $0.05 per page
   $\frac{0.05}{1}$

Find the unit rate.

8. $208 for 4 tires
   $52 per tire
9. 300 mi per 15 gal
   20 mi per gal
10. 240 people per 2 sq mi
    120 people per sq mi

Problem Solving

11. An ice skating rink charges $1.50 to rent ice skates for 30 minutes. What is the unit rate per hour for renting ice skates?
    $3.00 per hour

2 PRACTICE

Share and Show • Guided Practice

For Exercise 1, explain that the fraction bar can be read as the word *per* in a rate.

For Exercises 2–4, remind students to find the unit rate by writing an equivalent fraction with 1 in the denominator.

On Your Own • Independent Practice

For Exercises 8–10, remind students to include the units of measure in the rate.

Problem Solving

Math Processes and Practices

For Exercise 11, have students think about how many minutes equal an hour. Then ask them how they should find the rate in dollars per hour.

3 SUMMARIZE

Math Processes and Practices

Essential Question

How can you find rates and unit rates?

Possible answer: I can write a rate as a ratio in fraction form. To find the unit rate, I can find an equivalent fraction with a denominator of 1.

Math Journal

Explain how knowing a unit rate can help you determine other equivalent rates. Provide examples in your explanation.

LESSON 11

Distance, Rate, and Time

LESSON AT A GLANCE

Lesson Objective
Solve problems involving distance, rate, and time.

Materials
MathBoard

GO DIGITAL — Animated Math Models

1 TEACH and TALK

GO DIGITAL • Animated Math Models

Unlock the Problem

Math Processes and Practices

Have students read the problem.

Example 1

- **What is the question asking you to find: the distance, the rate, or the time?** time
- **Why do you divide to solve the problem?** Possible answer: I need to find the value of *t*, and division is the inverse operation of multiplication.
- **Why is $3\frac{1}{3}$ hours equivalent to 3 hours 20 minutes?** Possible answer: $\frac{1}{3}$ hour is $\frac{1}{3}$ of 60 minutes, which is 20 minutes.

Example 2

- **What is the question asking you to find: the distance, the rate, or the time?** distance
- **Why do you multiply 120 by 2 to find the value of *d*?** Possible answer: The distance, *d*, is equal to the product of the rate (120) and the time (2).

This lesson builds on division concepts presented in Chapter 2 and prepares students for solving distance, rate, and time problems taught in Grade 6.

Name _____

Distance, Rate, and Time

Essential Question How can you solve problems involving distance, rate, and time?

Unlock the Problem (Real World)

You can use the formula $d = r \times t$ to solve problems involving distance, rate, and time. In the formula, *d* represents distance, *r* represents rate, and *t* represents time. The rate is usually a unit rate comparing distance to time, such as miles per hour.

- What word is used in place of rate? **speed**
- What are the given values? **$d = 500$ and $r = 150$**
- What is the unknown value? **t, or time**

Example 1

The winner of an automobile race drove 500 miles at an average speed of 150 miles per hour. How long did it take the winner to finish the race?

STEP 1
Write the formula.
$d = r \times t$

STEP 2
Replace *d* with 500 and *r* with 150.
$d = r \times t$
$500 = 150 \times t$

STEP 3
Use what you know about inverse operations to find *t*.
$500 \div 150 = t$
$3\frac{1}{3} = t$

So, it takes the winner $3\frac{1}{3}$ hours or 3 hours 20 minutes to complete the race.

Example 2

A race car driver traveled at an average speed of 120 miles per hour to finish a race in 2 hours. What was the length of the race?

Possible answer: In Example 1, the missing value is a factor, so the inverse operation, division, must be used to find its value. In Example 2, the missing value is the product, which can be found using multiplication.

STEP 1
Write the formula.
$d = r \times t$

STEP 2
Replace *r* with 120 and *t* with 2.
$d = r \times t$
$d = 120 \times 2$

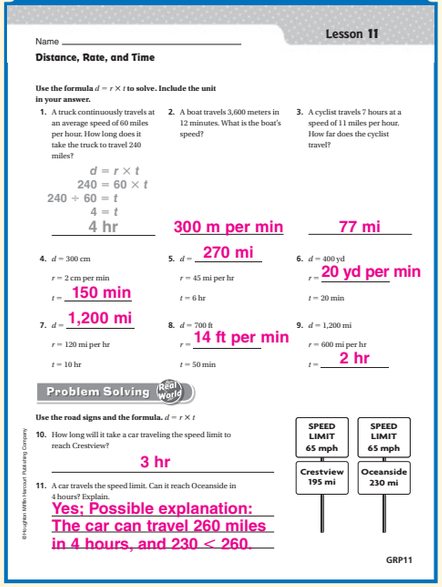
STEP 3
Multiply to solve for *d*.
$d = 120 \times 2$
$d = 240$

So, the race was 240 miles long.

Math Talk — Mathematical Practices
Why were different operations used in Step 3 of Examples 1 and 2?

See above.

GR: Practice, p. GRP11



Name _____ Lesson 11

Distance, Rate, and Time

Use the formula $d = r \times t$ to solve. Include the unit in your answer.

1. A truck continuously travels at an average speed of 60 miles per hour. How long does it take the truck to travel 240 miles?
$d = r \times t$
$240 = 60 \times t$
$240 \div 60 = t$
$4 = t$
4 hr

2. A boat travels 3,600 meters in 12 minutes. What is the boat's speed? 300 m per min

3. A cyclist travels 7 hours at a speed of 11 miles per hour. How far does the cyclist travel? 77 mi

4. d = 300 cm, r = 2 cm per min, t = 150 min

5. d = 270 mi, r = 45 mi per hr, t = 6 hr

6. d = 400 yd, r = 20 yd per min, t = 20 min

7. d = 1,200 mi, r = 120 mi per hr, t = 10 hr

8. d = 700 ft, r = 14 ft per min, t = 50 min

9. d = 1,200 mi, r = 600 mi per hr, t = 2 hr

Problem Solving (Real World)

Use the road signs and the formula $d = r \times t$

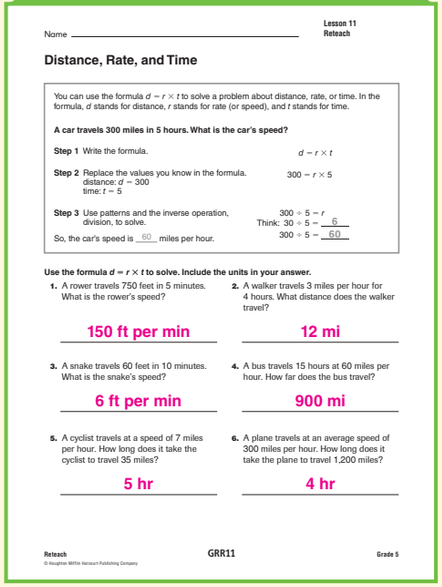
10. How long will it take a car traveling the speed limit to reach Crestview? 3 hr

11. A car travels the speed limit. Can it reach Oceanside in 4 hours? Explain. Yes; Possible explanation: The car can travel 260 miles in 4 hours, and 230 < 260.

SPEED LIMIT 65 mph — Crestview 195 mi
SPEED LIMIT 65 mph — Oceanside 230 mi

GRP11

GR: Reteach, p. GRR11



Name _____ Lesson 11 Reteach

Distance, Rate, and Time

You can use the formula $d = r \times t$ to solve a problem about distance, rate, or time. In the formula, *d* stands for distance, *r* stands for rate (or speed), and *t* stands for time.

A car travels 300 miles in 5 hours. What is the car's speed?

Step 1 Write the formula. $d = r \times t$

Step 2 Replace the values you know in the formula. distance: d = 300, time: t = 5. $300 = r \times 5$

Step 3 Use patterns and the inverse operation, division, to solve. $300 \div 5 = r$. Think: $30 \div 5 =$ 6, $300 \div 5 =$ 60

So, the car's speed is 60 miles per hour.

Use the formula $d = r \times t$ to solve. Include the units in your answer.

1. A rower travels 750 feet in 5 minutes. What is the rower's speed? 150 ft per min

2. A walker travels 3 miles per hour for 4 hours. What distance does the walker travel? 12 mi

3. A snake travels 60 feet in 10 minutes. What is the snake's speed? 6 ft per min

4. A bus travels 15 hours at 60 miles per hour. How far does the bus travel? 900 mi

5. A cyclist travels at a speed of 7 miles per hour. How long does it take the cyclist to travel 35 miles? 5 hr

6. A plane travels at an average speed of 300 miles per hour. How long does it take the plane to travel 1,200 miles? 4 hr

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Share and Show

MATH BOARD

1. A cyclist travels 45 miles in 3 hours. What is the cyclist's speed?

Write the formula: $d =$ [r] $\times$ [t]

Replace d with 45.

Replace t with 3.

The rate is 15 miles per hour.

Use the formula $d = r \times t$ to solve. Include the units in your answer.

2. A train travels at an average speed of 80 miles per hour for 5 hours. How far does the train travel?

400 miles

3. A horse travels at an average speed of 12 miles per hour. How long does it take the horse to travel 60 miles?

5 hours

On Your Own

Use the formula $d = r \times t$ to solve. Include the unit in your answer.

4. A hiker travels at a speed of 3 miles per hour for 3 hours. How far does the hiker travel in that time?

9 miles

5. A snail travels at a speed of 2 centimeters per minute. How long does the snail take to travel 30 centimeters?

15 minutes

6. A boat travels 6 miles in 24 minutes. What is the average speed of the boat?

$\frac{1}{4}$ mile per minute

7. $d = 320$ cm

$r =$ 40 cm per sec

$t = 8$ sec

8. $d =$ 300 km

$r = 50$ km per hr

$t = 6$ hr

9. $d = 150$ ft

$r = 20$ ft per min

$t =$ $7\frac{1}{2}$ min or 7.5 min

Problem Solving

Real World

10. In an experiment, Ava found that it took a ball 5 seconds to roll down an 80-foot ramp. What is the average speed of the ball?

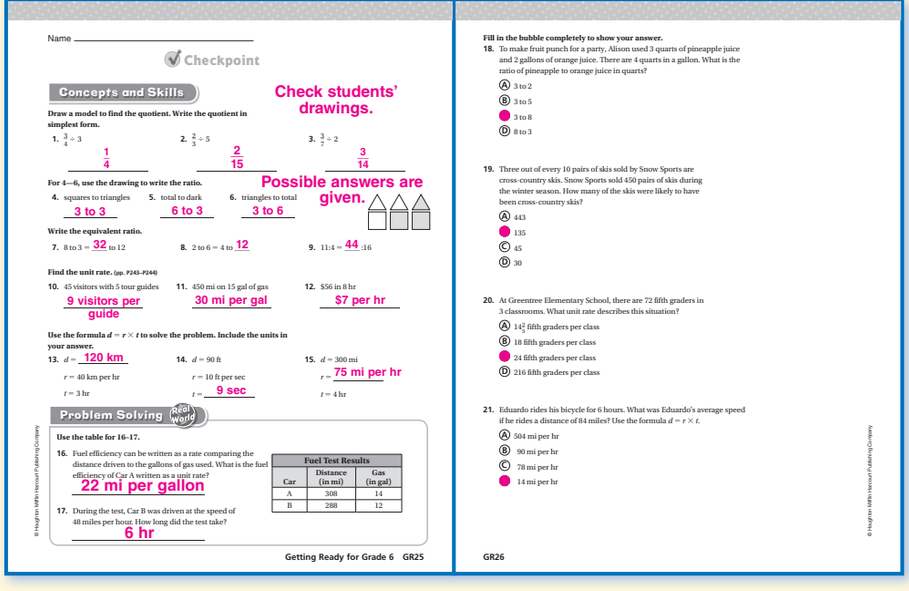
16 feet per second

11. Jason's family is driving 1,375 miles to Grand Canyon National Park. They plan to drive at an average speed of 55 miles per hour. How long will they be driving to reach the park?

25 hours

Getting Ready Lessons and Resources, pp. GR25–GR26

Checkpoint



Name _____

Checkpoint

Concepts and Skills

Check students' drawings.

Draw a model to find the quotient. Write the quotient in simplest form.

1. $\frac{1}{4} \div 3$ — $\frac{1}{4}$
2. $\frac{2}{3} \div 5$ — $\frac{2}{15}$
3. $\frac{3}{7} \div 2$ — $\frac{3}{14}$

For 4—6, use the drawing to write the ratio.

Possible answers are given.

4. squares to triangles — 3 to 3
5. total to dark — 6 to 3
6. triangles to total — 3 to 6

Write the equivalent ratio.

7. 8 to 3 = 32 to 12
8. 2 to 6 = 4 to 12
9. 11:4 = 44 :16

Find the unit rate. (pp. P243–P244)

10. 45 visitors with 5 tour guides — 9 visitors per guide
11. 450 mi on 15 gal of gas — 30 mi per gal
12. $56 in 8 hr — $7 per hr

Use the formula $d = r \times t$ to solve the problem. Include the units in your answer.

13. $d =$ 120 km; $r = 40$ km per hr; $t = 3$ hr
14. $d = 90$ ft; $r = 10$ ft per sec; $t =$ 9 sec
15. $d = 300$ mi; $r =$ 75 mi per hr; $t = 4$ hr

Problem Solving Real World

Use the table for 16–17.

16. Fuel efficiency can be written as a rate comparing the distance driven to the gallons of gas used. What is the fuel efficiency of Car A written as a unit rate? 22 mi per gallon

17. During the test, Car B was driven at the speed of 48 miles per hour. How long did the test take? 6 hr

Fuel Test Results		
Car	Distance (in mi)	Gas (in gal)
A	308	14
B	288	12

Fill in the bubble completely to show your answer.

18. To make fruit punch for a party, Alison used 3 quarts of pineapple juice and 2 gallons of orange juice. There are 4 quarts in a gallon. What is the ratio of pineapple to orange juice in quarts?
   - Ⓐ 3 to 2
   - Ⓑ 3 to 5
   - ● 3 to 8
   - Ⓓ 8 to 3

19. Three out of every 10 pairs of skis sold by Snow Sports are cross-country skis. Snow Sports sold 450 pairs of skis during the winter season. How many of the skis were likely to have been cross-country skis?
   - Ⓐ 443
   - ● 135
   - Ⓒ 45
   - Ⓓ 30

20. At Greentree Elementary School, there are 72 fifth graders in 3 classrooms. What unit rate describes this situation?
   - Ⓐ $14\frac{2}{5}$ fifth graders per class
   - Ⓑ 18 fifth graders per class
   - ● 24 fifth graders per class
   - Ⓓ 216 fifth graders per class

21. Eduardo rides his bicycle for 6 hours. What was Eduardo's average speed if he rides a distance of 84 miles? Use the formula $d = r \times t$.
   - Ⓐ 504 mi per hr
   - Ⓑ 90 mi per hr
   - Ⓒ 78 mi per hr
   - ● 14 mi per hr

2 PRACTICE

MATH BOARD

Share and Show • Guided Practice

For Exercises 1–3, remind students that the speed is the rate.

On Your Own • Independent Practice

For Exercise 6, make sure students use 6 for the distance and 24 for the time. This will result in an answer that is a fraction.

Problem Solving Math Processes and Practices

For Exercises 10 and 11, remind students to identify the known information as distance, rate, or time before replacing the variables with given values into the formula.

3 SUMMARIZE

Math Processes and Practices

Essential Question

How can you solve problems involving distance, rate, and time? Possible answer: I can use the formula, $d = r \times t$. I replace the variables in the formula with the known values and solve to find the unknown value.

Math Journal WRITE Math

Write a word problem involving distance, rate, and time. Explain how to solve your problem.

Getting Ready for Grade 6 Test

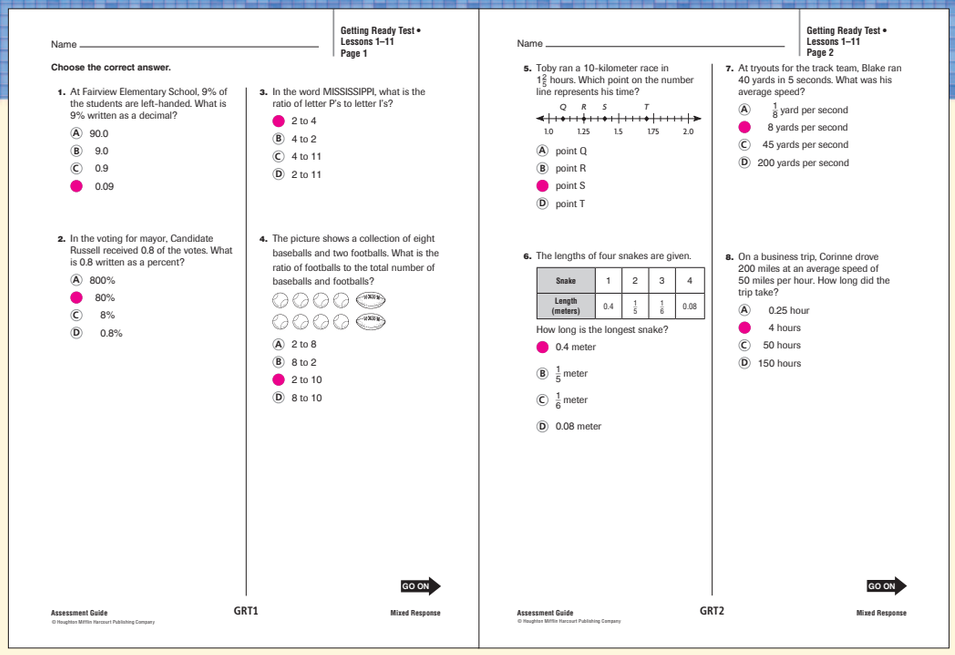
LESSONS 1 TO 11

Summative Assessment

Use the **Getting Ready Test** to assess students' progress in Getting Ready for Grade 6 Lessons 1–11.

Getting Ready Tests are provided in multiple-choice and mixed-response format in the *Getting Ready Lessons and Resources*.

GO DIGITAL Getting Ready Test is available online.



Name _____ Getting Ready Test • Lessons 1–11 Page 1

Choose the correct answer.

1. At Fairview Elementary School, 9% of the students are left-handed. What is 9% written as a decimal?
   - (A) 90.0
   - (B) 9.0
   - (C) 0.9
   - ● 0.09

2. In the voting for mayor, Candidate Russell received 0.8 of the votes. What is 0.8 written as a percent?
   - (A) 800%
   - ● 80%
   - (C) 8%
   - (D) 0.8%

3. In the word MISSISSIPPI, what is the ratio of letter P's to letter I's?
   - ● 2 to 4
   - (B) 4 to 2
   - (C) 4 to 11
   - (D) 2 to 11

4. The picture shows a collection of eight baseballs and two footballs. What is the ratio of footballs to the total number of baseballs and footballs?
   - (A) 2 to 8
   - (B) 8 to 2
   - ● 2 to 10
   - (D) 8 to 10

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Name _____ Getting Ready Test • Lessons 1–11 Page 2

5. Toby ran a 10-kilometer race in $1\frac{5}{8}$ hours. Which point on the number line represents his time?

   - (A) point Q
   - (B) point R
   - ● point S
   - (D) point T

6. The lengths of four snakes are given.

Snake	1	2	3	4
Length (meters)	0.4	$\frac{1}{5}$	$\frac{1}{6}$	0.08

How long is the longest snake?
   - ● 0.4 meter
   - (B) $\frac{1}{5}$ meter
   - (C) $\frac{1}{6}$ meter
   - (D) 0.08 meter

7. At tryouts for the track team, Blake ran 40 yards in 5 seconds. What was his average speed?
   - (A) $\frac{1}{8}$ yard per second
   - ● 8 yards per second
   - (C) 45 yards per second
   - (D) 200 yards per second

8. On a business trip, Corinne drove 200 miles at an average speed of 50 miles per hour. How long did the trip take?
   - (A) 0.25 hour
   - ● 4 hours
   - (C) 50 hours
   - (D) 150 hours

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Name _____ Getting Ready Test • Lessons 1–11 Page 3

9. Members of the Canoe Club paddled at an average rate of 8 kilometers per hour for 4 hours. How far did they travel?
   - (A) 0.5 kilometer
   - (B) 2 kilometers
   - (C) 12 kilometers
   - ● 32 kilometers

10. The ratio of girls to boys in the school orchestra is 15 to 10. Which ratio is equivalent to 15 to 10?
   - (A) 10 to 5
   - (B) 10 to 15
   - ● 12 to 8
   - (D) 32 to 24

11. Four of every 9 boxes of Crispy Critters cereal contain a prize. There are 54 boxes of Crispy Critters on the shelf at the grocery store. How many of the boxes would you expect to contain a prize?
   - (A) 6
   - ● 24
   - (C) 27
   - (D) 45

12. Jorge got a hit $\frac{8}{25}$ of the times that he batted. What percent of the times did he get a hit?
   - (A) 8%
   - (B) 16%
   - ● 32%
   - (D) 64%

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Name _____ Getting Ready Test • Lessons 1–11 Page 4

Write the correct answer.

13. In a survey, 80 percent of those surveyed had at least one brother or sister. What fraction of those surveyed had at least one brother or sister? Write your answer in simplest form.

$\frac{4}{5}$

14. In a survey, $\frac{7}{20}$ of the students in fifth grade said their family buys organic vegetables. What decimal represents the portion of students whose families buy organic vegetables?

0.35

15. It took Francisco 60 minutes to walk from his house to his grandmother's house. What is 60 written as a product of factors greater than 1? Each factor can have only 1 and itself as factors.

$2 \times 2 \times 3 \times 5$

16. There are 225 students in the fifth grade. What is 225 written as a product of factors greater than 1? Each factor can have only 1 and itself as factors.

$3 \times 3 \times 5 \times 5$

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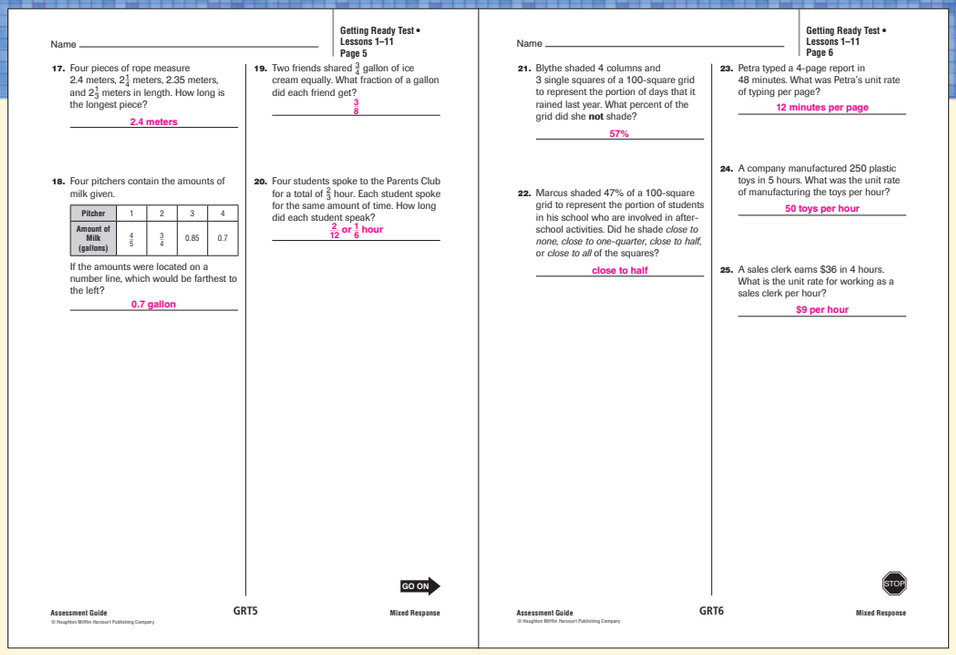
Data-Driven Decision Making RtI

Item	Lesson	Common Error	Intervene With
1, 2	5	May not understand the relationship between decimals and percents	**R**—GRR5
3, 4	8	May not understand the relationship between the parts of a quantity and the whole of a quantity	**R**—GRR8
5, 6	2	May not understand how to find and compare decimals, fractions, and mixed numbers	**R**—GRR2
7, 8, 9	11	May not understand how to solve problems involving distance, rate, and time	**R**—GRR11
10, 11	9	May not understand how to find ratios that are equivalent to given ratios	**R**—GRR9
12, 13, 14	6	May not understand how to convert among fractions, decimals, and percents	**R**—GRR6

Key: R—Getting Ready Lessons and Resources: Reteach



Name _____ Getting Ready Test • Lessons 1–11 Page 5

17. Four pieces of rope measure 2.4 meters, $2\frac{1}{2}$ meters, 2.35 meters, and $2\frac{1}{5}$ meters in length. How long is the longest piece?

2.4 meters

18. Four pitchers contain the amounts of milk given.

Pitcher	1	2	3	4
Amount of Milk (gallons)	$\frac{4}{5}$	$\frac{3}{4}$	0.85	0.7

If the amounts were located on a number line, which would be farthest to the left?

0.7 gallon

19. Two friends shared $\frac{3}{8}$ gallon of ice cream equally. What fraction of a gallon did each friend get?

$\frac{3}{8}$

20. Four students spoke to the Parents Club for a total of $\frac{5}{6}$ hour. Each student spoke for the same amount of time. How long did each student speak?

$\frac{2}{12}$ or $\frac{1}{6}$ hour

GO ON

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Name _____ Getting Ready Test • Lessons 1–11 Page 6

21. Blythe shaded 4 columns and 3 single squares of a 100-square grid to represent the portion of days that it rained last year. What percent of the grid did she **not** shade?

57%

22. Marcus shaded 47% of a 100-square grid to represent the portion of students in his school who are involved in after-school activities. Did he shade *close to none, close to one-quarter, close to half,* or *close to all* of the squares?

close to half

23. Petra typed a 4-page report in 48 minutes. What was Petra's unit rate of typing per page?

12 minutes per page

24. A company manufactured 250 plastic toys in 5 hours. What was the unit rate of manufacturing the toys per hour?

50 toys per hour

25. A sales clerk earns $36 in 4 hours. What is the unit rate for working as a sales clerk per hour?

$9 per hour

STOP

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Portfolio Suggestions The portfolio represents the growth, talents, achievements, and reflections of the mathematics learner. Students might spend a short time selecting work samples for their portfolios.

You may want to have students respond to the following questions:

- What new understanding of math have I developed in the past several weeks?
- What growth in understanding or skills can I see in my work?
- What can I do to improve my understanding of math ideas?
- What would I like to learn more about?

For information about how to organize, share, and evaluate portfolios, see the *Chapter Resources.*

Data-Driven Decision Making RtI

Item	Lesson	Common Error	Intervene With
15, 16	3	May not understand what a factor is and how to find the factors of a given number	**R**—GRR3
17, 18	1	May not understand how to compare fractions, decimals, and percents	**R**—GRR1
19, 20	7	May not understand how to divide a fraction by a whole number	**R**—GRR7
21, 22	4	May not understand how to express real-world quantities as percents	**R**—GRR4
23, 24, 25	10	May not understand how to find a unit rate, given a rate	**R**—GRR10

Key: R—Getting Ready Lessons and Resources: Reteach

LESSON 12

Understand Integers

LESSON AT A GLANCE

Lesson Objective
Understand positive and negative numbers, and use them to represent real world quantities.

Vocabulary
integer, opposite

Materials
MathBoard

GO DIGITAL Animated Math Models

1 TEACH and TALK

GO DIGITAL • Animated Math Models

Unlock the Problem

Math Processes and Practices

Have students read the opening paragraph. Discuss the new vocabulary.

- **What is the opposite of $^{-}2$? Explain.** 2; Possible explanation: On a number line integers that are opposite are the same distance from 0. $^{-}2$ is 2 units to left of 0, so the opposite is 2 units to the right of 0, $^{+}2$ or 2.
- **Are there any integers between 0 and 1? Explain.** No. Possible explanation: There are no numbers between 0 and 1 that are whole numbers or their opposites.

This lesson builds on understanding the composition of the number line presented in Chapters 1 and 9, and prepares students for integers taught in Grade 6.

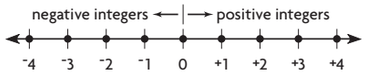
Name _____

Understand Integers

Essential Question How can you use positive and negative numbers to represent real world quantities?

Unlock the Problem Real World

Connect You have used a number line to show 0 and whole numbers. You can extend the number line to the left of 0 to show the **opposites** of the whole numbers. For example, the opposite of $^{+}3$ is $^{-}3$. Any whole number or the opposite of a whole number is called an **integer**.



Negative integers are written with a negative sign, $^{-}$. Positive integers are written with or without a positive sign, $^{+}$.

- How can you tell whether a number is an integer or not?

Possible answer: It is an integer if it is a whole number or the opposite of a whole number.

Example 1

The temperature in Fairbanks, Alaska, was 37 degrees below zero. Write an integer to represent the situation.

STEP 1 Decide whether the integer is positive or negative.

The word below tells me that the integer is negative.

STEP 2 Write the integer: $^{-}37$

So, the temperature in Fairbanks was $^{-}37$ degrees.

Example 2

The Koala Bears gained 11 yards on a football play. Write an integer to represent the situation. Then, tell what 0 represents in that situation.

STEP 1 Decide what positive integers and negative integers represent.

Positive integers represent yards gained.

Negative integers represent yards lost.

STEP 2 Decide what 0 represents.

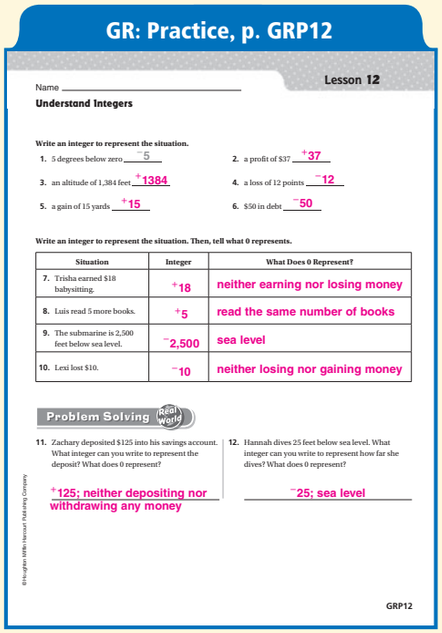
So, 0 means yards were neither gained nor lost.

Possible answers: below, less than, lost, before, under

Math Talk Mathematical Practices

Identify some words that might tell you that an integer is negative.

GR: Practice, p. GRP12



Name _____ Lesson 12

Understand Integers

Write an integer to represent the situation.

1. 5 degrees below zero $^{-}5$
2. a profit of $37 $^{+}37$
3. an altitude of 1,384 feet $^{+}1384$
4. a loss of 12 points $^{-}12$
5. a gain of 15 yards $^{+}15$
6. $50 in debt $^{-}50$

Write an integer to represent the situation. Then, tell what 0 represents.

Situation	Integer	What Does 0 Represent?
7. Trisha earned $18 babysitting.	$^{+}18$	neither earning nor losing money
8. Luis read 5 more books.	$^{+}5$	read the same number of books
9. The submarine is 2,500 feet below sea level.	$^{-}2{,}500$	sea level
10. Lexi lost $10.	$^{-}10$	neither losing nor gaining money

Problem Solving Real World

11. Zachary deposited $125 into his savings account. What integer can you write to represent the deposit? What does 0 represent?

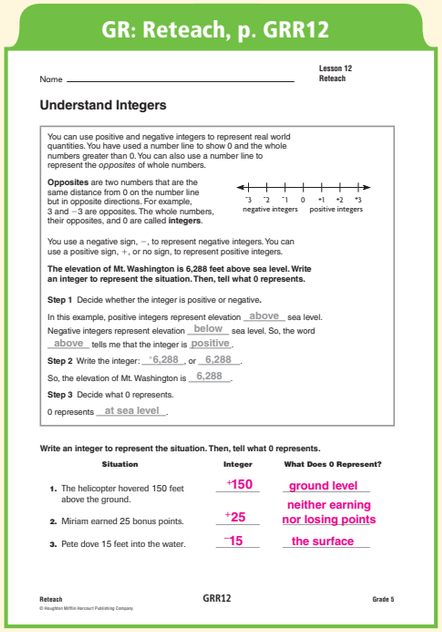
$^{+}125$; neither depositing nor withdrawing any money

12. Hannah dives 25 feet below sea level. What integer can you write to represent how far she dives? What does 0 represent?

$^{-}25$; sea level

GRP12

GR: Reteach, p. GRR12



Name _____ Lesson 12 Reteach

Understand Integers

You can use positive and negative integers to represent real world quantities. You have used a number line to show 0 and the whole numbers greater than 0. You can also use a number line to represent the *opposites* of whole numbers.

Opposites are two numbers that are the same distance from 0 on the number line but in opposite directions. For example, 3 and −3 are opposites. The whole numbers, their opposites, and 0 are called **integers**.

−3 −2 −1 0 +1 +2 +3
negative integers positive integers

You use a negative sign, −, to represent negative integers. You can use a positive sign, +, or no sign, to represent positive integers.

The elevation of Mt. Washington is 6,288 feet above sea level. Write an integer to represent the situation. Then, tell what 0 represents.

Step 1 Decide whether the integer is positive or negative.

In this example, positive integers represent elevation above sea level. Negative integers represent elevation below sea level. So, the word above tells me that the integer is positive.

Step 2 Write the integer: $^{+}6{,}288$, or $6{,}288$.

So, the elevation of Mt. Washington is 6,288.

Step 3 Decide what 0 represents.

0 represents at sea level.

Write an integer to represent the situation. Then, tell what 0 represents.

Situation	Integer	What Does 0 Represent?
1. The helicopter hovered 150 feet above the ground.	$^{+}150$	ground level
2. Miriam earned 25 bonus points.	$^{+}25$	neither earning nor losing points
3. Pete dove 15 feet into the water.	$^{-}15$	the surface

Reteach GRR12 Grade 5

*GR – Getting Ready Lessons and Resources (*www.thinkcentral.com*)

Share and Show

Write an integer to represent the situation.

1. a loss of $25

   The word *loss* represents an integer that is negative.

   The integer that represents the situation is -25.

2. 73 degrees above zero $+73$

3. 200 feet below sea level -200

4. a profit of $76 $+76$

Write an integer to represent the situation. Then, tell what 0 represents.

Situation	Integer	What Does 0 Represent?
5. The passenger jet flew at an altitude of 34,000 feet.	$+34{,}000$	sea level
6. Zack lost 45 points on his first turn.	-45	neither gaining nor losing points
7. Craig was 20 minutes early for his appointment.	-20	on time for the appointment

On Your Own

Write an integer to represent the situation.

8. the temperature went up 2 degrees $+2$

9. 11 feet below sea level -11

10. an increase of 37 students $+37$

11. 15 seconds before rocket liftoff -15

Write an integer to represent the situation. Then, tell what 0 represents.

Situation	Integer	What Does 0 Represent?
12. Amelia earned $1,200 in one week.	$+1{,}200$	neither earning nor losing money
13. The coal was 2 miles below ground level.	-2	ground level
14. The alarm clock rang 5 minutes early.	-5	the alarm ringing on time

Problem Solving

15. Gina withdrew $600 from her checking account to pay for her new guitar. What integer can you write to represent the withdrawal? What does 0 represent?

    -600; neither withdrawing nor depositing money in her checking acount

Example 1

- **What is the opposite of 37 degrees below zero?** 37 degrees above zero

Example 2

- **How could you use an integer to represent 11 yards lost?** -11

2 PRACTICE

Share and Show • Guided Practice

For Exercise 4, help students to see that a "profit" is a gain in the amount of money you have. So, as with a gain of 11 yards on a football play, it is represented by a positive integer.

On Your Own • Independent Practice

If students have difficulty with Exercises 12–14, encourage them to look for words that suggest integers and then to think of the opposites of those words. For Exercise 13, "below ground level" suggests a negative integer. The opposite is "above ground level." Zero represents what is between above ground level and below ground level, namely, ground level itself.

Problem Solving Math Processes and Practices

You may wish to explain that "withdrawing" money from a checking account is taking money *out of* the account. Since this decreases the amount in the account, the withdrawal is represented by a negative integer.

3 SUMMARIZE

Math Processes and Practices

Essential Question

How can you use positive and negative numbers to represent real world quantities?

Possible answer: Decide whether the quantity is best represented as positive or negative. Then write the integer with the appropriate positive or negative sign.

Math Journal WRITE Math

Make a list of words that suggest positive real world quantities and a list of words that suggest negative real world quantities.

LESSON 13

Algebra • Write and Evaluate Expressions

LESSON AT A GLANCE

Lesson Objective
Write and evaluate expressions.

Materials
MathBoard

GO DIGITAL
Animated Math Models
HMH Mega Math

1 TEACH and TALK

GO DIGITAL • Animated Math Models

Unlock the Problem

Math Processes and Practices

Tell students that an *expression* is a series of numbers, variables, and operations that describe a value.

Read the first problem aloud. Help students see how $5 + c$ relates to the word description, and show them how they can replace the variable with a number in order to evaluate the expression.

Try This!

- **If the tools cost $18, how can you find out how much Montel will pay?** add 5 **What is the expression?** 5 + 18
- **Write an example of an expression for *x*.** Answers will vary. **How can you evaluate the expression if $x = 2$?** Possible answer: I will replace *x* in my expression with 2 and then evaluate the expression by performing the operation in the expression.

This lesson builds on writing and evaluating numerical expressions presented in Chapter 1 and prepares students for writing and evaluating algebraic expressions in Grade 6.

Name _____

Write and Evaluate Expressions

Essential Question How can you write and evaluate expressions?

Unlock the Problem Real World

Montel hires Shea to buy some tools for him at the hardware store. Montel will pay Shea $5 more than the cost of the tools she buys.

- The problem states that Montel will pay $5 *more than cost*. What operation do the words *more than* suggest? addition

A. How can you represent this payment as an expression?

B. How can you use the expression to calculate what Montel will pay Shea?

Write an expression for what Montel will pay.

STEP 1 Choose a variable and explain what it stands for.

Let *c* equal the cost of the tools.

STEP 2 Write a word expression.

$5 more than the cost.

5 dollars more than the cost → 5 + *c*

STEP 3 Replace the word expression with an addition expression using *c*.

$5 + c$

So, an expression that tells how much Montel owes Shea is $5 + c$.

Try This! **If the tools cost a total of $18, how much will Montel pay Shea? Evaluate the expression $5 + c$ for $c = 18$.**

STEP 1 Write the expression. $5 + c$

STEP 2 Replace *c* with 18. $5 + 18$

STEP 3 Add to evaluate. $5 + 18 = 23$

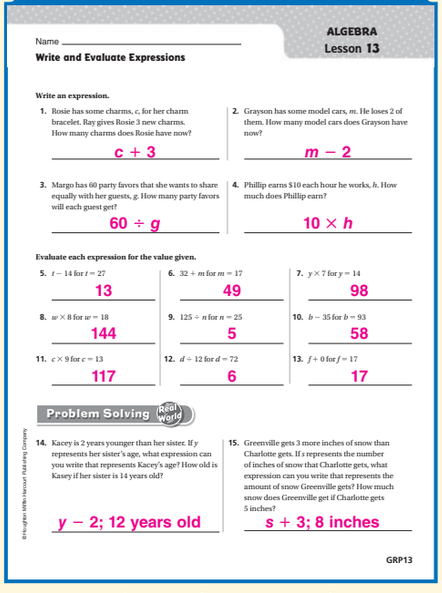
So, Montel will pay Shea $23.

Math Talk **Mathematical Practices**

What key words might tell you that you need to use addition in a word problem?

Possible answers: more than, plus, greater than, in all, total, altogether

GR: Practice, p. GRP13



Name _____ ALGEBRA Lesson 13

Write and Evaluate Expressions

Write an expression.

1. Rosie has some charms, *c*, for her charm bracelet. Ray gives Rosie 3 new charms. How many charms does Rosie have now? $c + 3$
2. Grayson has some model cars, *m*. He loses 2 of them. How many model cars does Grayson have now? $m - 2$
3. Margo has 60 party favors that she wants to share equally with her guests, *g*. How many party favors will each guest get? $60 \div g$
4. Phillip earns $10 each hour he works, *h*. How much does Phillip earn? $10 \times h$

Evaluate each expression for the value given.

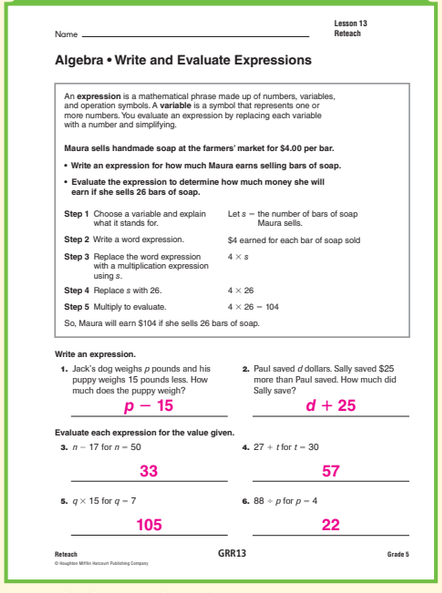
5. $t - 14$ for $t = 27$: 13
6. $32 + m$ for $m = 17$: 49
7. $y \times 7$ for $y = 14$: 98
8. $w \times 8$ for $w = 18$: 144
9. $125 \div n$ for $n = 25$: 5
10. $b - 35$ for $b = 93$: 58
11. $c \times 9$ for $c = 13$: 117
12. $d \div 12$ for $d = 72$: 6
13. $f + 0$ for $f = 17$: 17

Problem Solving Real World

14. Kacey is 2 years younger than her sister. If *y* represents her sister's age, what expression can you write that represents Kacey's age? How old is Kasey if her sister is 14 years old? $y - 2$; 12 years old
15. Greenville gets 3 more inches of snow than Charlotte gets. If *s* represents the number of inches of snow that Charlotte gets, what expression can you write that represents the amount of snow Greenville gets? How much snow does Greenville get if Charlotte gets 5 inches? $s + 3$; 8 inches

GRP13

GR: Reteach, p. GRR13



Name _____ Lesson 13 Reteach

Algebra • Write and Evaluate Expressions

An **expression** is a mathematical phrase made up of numbers, variables, and operation symbols. A **variable** is a symbol that represents one or more numbers. You evaluate an expression by replacing each variable with a number and simplifying.

Maura sells handmade soap at the farmers' market for $4.00 per bar.

- **Write an expression for how much Maura earns selling bars of soap.**
- **Evaluate the expression to determine how much money she will earn if she sells 26 bars of soap.**

Step 1 Choose a variable and explain what it stands for.	Let *s* = the number of bars of soap Maura sells.
Step 2 Write a word expression.	$4 earned for each bar of soap sold
Step 3 Replace the word expression with a multiplication expression using *s*.	$4 \times s$
Step 4 Replace *s* with 26.	4×26
Step 5 Multiply to evaluate.	$4 \times 26 = 104$

So, Maura will earn $104 if she sells 26 bars of soap.

Write an expression.

1. Jack's dog weighs *p* pounds and his puppy weighs 15 pounds less. How much does the puppy weigh? $p - 15$
2. Paul saved *d* dollars. Sally saved $25 more than Paul saved. How much did Sally save? $d + 25$

Evaluate each expression for the value given.

3. $n - 17$ for $n = 50$: 33
4. $27 + t$ for $t = 30$: 57
5. $q \times 15$ for $q = 7$: 105
6. $88 \div p$ for $p = 4$: 22

Reteach GRR13 Grade 5

*GR – Getting Ready Lessons and Resources (*www.thinkcentral.com*)

Share and Show

Write an expression.
Tallahassee's temperature is 15 degrees less than the temperature in Miami.

1a. What operation does the phrase *less than* suggest?
subtraction

1b. Write a word expression:
Possible answer: 15° less than the Miami temperature

1c. Write an expression for Tallahassee's temperature. Let m stand for the temperature in Miami.
$m - 15$

1d. Evaluate the expression for Tallahassee's temperature for $m = 90$.
75

Evaluate each expression for the value given.

2. $b - 45$ for $b = 70$
25

3. $13 + a$ for $a = 40$
53

On Your Own

Write an expression.

4. Zeke has some tropical fish, f. Dean gave Zeke 5 new fish. How many fish does Zeke have now?
$f + 5$

5. Myra had some candles, c. She used up 12 of them. How many candles does Myra have now?
$c - 12$

Evaluate each expression for the value given.

6. $s - 18$ for $s = 80$
62

7. $49 + k$ for $k = 31$
80

8. $w \times 6$ for $w = 13$
78

9. $60 \div n$ for $n = 20$
3

10. $t \times 12$ for $t = 8$
96

11. $r - 25$ for $r = 110$
85

Problem Solving

12. Keith is 2 inches shorter than his sister. If s represents his sister's height, what expression can you write that represents Keith's height?
Possible answer: $s - 2$

2 PRACTICE

Share and Show • Guided Practice

For Exercise 1, work with students to write the word description as an expression with variables.

On Your Own • Independent Practice

For Exercises 6–11, encourage students to write out the steps to evaluate an expression as they replace the variable with a value in the expression.

Problem Solving

Math Processes and Practices

Encourage students to draw and label a diagram that relates Keith and his sister's height.

3 SUMMARIZE

Math Processes and Practices

Essential Question

How can you write and evaluate expressions?

Possible answer: Write an expression that matches the word description. Replace the variable with a given value and evaluate the expression.

Math Journal

Explain how to evaluate the expression $40 \div c$ for $c = 8$.

LESSON 14

Algebra • Understand Inequalities

LESSON AT A GLANCE

Lesson Objective
Understand inequalities and use them to solve problems.

Materials
MathBoard, Number Lines (see *eTeacher Resources*)

1 TEACH and TALK

Unlock the Problem

Math Processes and Practices

Write the word *inequality* on the board. Point out the root word, *equal*. Tell students that an inequality compares two unequal quantities.

Review the symbols $<$ (less than), $>$ (greater than), $\leq$ (less than or equal to) and $\geq$ (greater than or equal to).

Write the expression $c > 7$ on the board. Help students read it aloud as "c is greater than 7." Point out that the expression should be read from left to right.

- **What does the expression $t < 9$ represent in this problem?** All bagels are less than 9 minutes old.

Try This!

- **A number can be a solution when it makes the statement $t < 9$ true. Why are 9 and 12 not solutions for this inequality?** These numbers are not less than 9.
- **What are possible whole-number solutions for $t < 9$?** Possible answers: 0, 1, 2, 3, 4, 5, 6, 7, 8

Use Math Talk to focus on students' understanding of inequality symbols.

This lesson builds on comparisons presented in Chapter 3, and prepares students for inequalities in Grade 6.

Name _____

Understand Inequalities

Essential Question How can you use inequalities to solve problems?

Unlock the Problem (Real World)

Every morning, Bobbi's Hot Bagels makes a special claim. All bagels Bobbi's sells will be warm and less than 9 minutes old. What **inequality** can you write to represent in whole minutes how old Bobbi's bagels are?

An inequality is a number sentence that compares two unequal quantities and uses the symbols $<$, $>$, $\leq$, or $\geq$.

- What clue words tell you that this problem involves an inequality?

Possible answer: the words *less than*

Write an inequality using a variable.

STEP 1 Write the inequality in words. time → is less than → 9

STEP 2 Replace *time* with the variable *t*. t → less than → 9

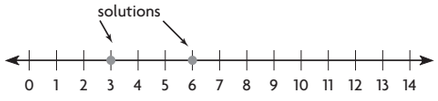
STEP 3 Replace the words *less than* with a *less than* ($<$) symbol. $t < 9$

Try This! **Graph the solutions on the number line. Of 3, 6, 9, and 12, which numbers are solutions for $t < 9$?**

STEP 1 In $t < 9$, replace t with 3. Repeat the process for $t = 6, 9, 12$.
$t < 9$
$3 < 9$ ← true

STEP 2 Identify the values that make $t < 9$ true.
True values are solutions: $t = 3, 6$.
False values are not solutions: $t \neq 9, 12$.
$6 < 9$ ← true
$9 < 9$ ← false
$12 < 9$ ← false

STEP 3 Graph the solutions on a number line.
Graph true values with filled circles.

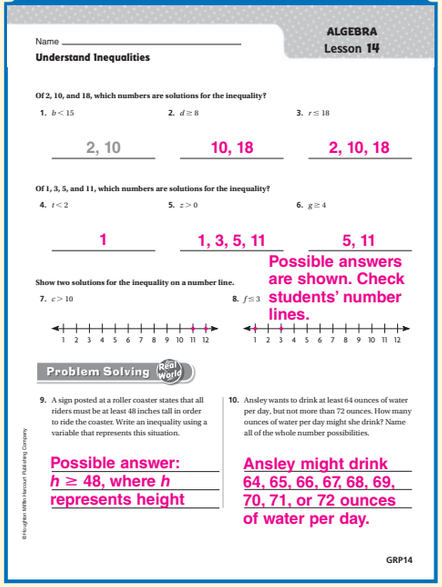


Possible answer: 9 would also be a solution for the inequality.

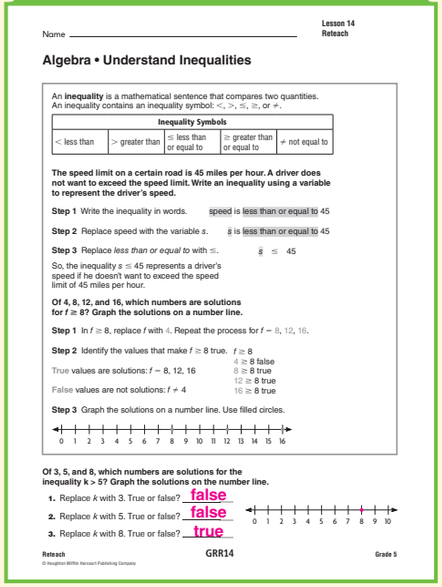
Math Talk — Mathematical Practices

How does the answer for the problem change if the inequality is "t is less than or equal to 9"?

GR: Practice, p. GRP14


Name _____ ALGEBRA Lesson 14
Understand Inequalities
Of 2, 10, and 18, which numbers are solutions for the inequality?
1. $b < 15$ 2. $d \geq 8$ 3. $r \leq 18$
2, 10 | 10, 18 | 2, 10, 18
Of 1, 3, 5, and 11, which numbers are solutions for the inequality?
4. $t < 2$ 5. $z > 0$ 6. $g \geq 4$
1 | 1, 3, 5, 11 | 5, 11
Show two solutions for the inequality on a number line.
7. $c > 10$ 8. $f \leq 3$
Possible answers are shown. Check students' number lines.
Problem Solving (Real World)
9. A sign posted at a roller coaster states that all riders must be at least 48 inches tall in order to ride the coaster. Write an inequality using a variable that represents this situation.
Possible answer: $h \geq 48$, where h represents height
10. Ansley wants to drink at least 64 ounces of water per day, but not more than 72 ounces. How many ounces of water per day might she drink? Name all of the whole number possibilities.
Ansley might drink 64, 65, 66, 67, 68, 69, 70, 71, or 72 ounces of water per day.
GRP14

GR: Reteach, p. GRR14


Name _____ Lesson 14 Reteach
Algebra • Understand Inequalities
An **inequality** is a mathematical sentence that compares two quantities. An inequality contains an inequality symbol: $<$, $>$, $\leq$, $\geq$, or $\neq$.
Inequality Symbols
$<$ less than | $>$ greater than | $\leq$ less than or equal to | $\geq$ greater than or equal to | $\neq$ not equal to
The speed limit on a certain road is 45 miles per hour. A driver does not want to exceed the speed limit. Write an inequality using a variable to represent the driver's speed.
Step 1 Write the inequality in words. speed is less than or equal to 45
Step 2 Replace speed with the variable s. s is less than or equal to 45
Step 3 Replace *less than or equal to* with $\leq$. $s \leq 45$
So, the inequality $s \leq 45$ represents a driver's speed if he doesn't want to exceed the speed limit of 45 miles per hour.
Of 4, 8, 12, and 16, which numbers are solutions for $f \geq 8$? Graph the solutions on a number line.
Step 1 In $f \geq 8$, replace f with 4. Repeat the process for $f = 8, 12, 16$.
Step 2 Identify the values that make $f \geq 8$ true. $f \geq 8$
True values are solutions: $f = 8, 12, 16$ — $4 \geq 8$ false; $8 \geq 8$ true; $12 \geq 8$ true; $16 \geq 8$ true
False values are not solutions: $f \neq 4$
Step 3 Graph the solutions on a number line. Use filled circles.
Of 3, 5, and 8, which numbers are solutions for the inequality $k > 5$? Graph the solutions on the number line.
1. Replace k with 3. True or false? false
2. Replace k with 5. True or false? false
3. Replace k with 8. True or false? true
Reteach GRR14 Grade 5

*GR – Getting Ready Lessons and Resources (*www.thinkcentral.com*)

Share and Show

MATH BOARD

Of 2, 5, and 8, which numbers are solutions for the inequality $x \geq 5$?
Graph the solutions on the number line.

1a. Replace x with 2. True or false?

$2 \geq 5$, false

1b. Replace x with 5. True or false?

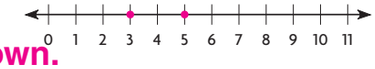
$5 \geq 5$, true

1c. Replace x with 8. True or false?

$8 \geq 5$, true

Show two solutions for the inequality on a number line.

2. $a < 6$



Sample answers are shown.
Any value less than 6 is correct.

On Your Own

Of 7, 10, and 13, which numbers are solutions for the inequality?

3. $m > 8$ — 10, 13

4. $b \leq 10$ — 7, 10

5. $c < 15$ — 7, 10, 13

Of 0, 4, 6, and 11, which numbers are solutions for the inequality?

6. $d \geq 8$ — 11

7. $r < 1$ — 0

8. $s > 4$ — 6, 11

Show two solutions for the inequality on a number line.

9. $n \leq 6$

10. $x > 2$

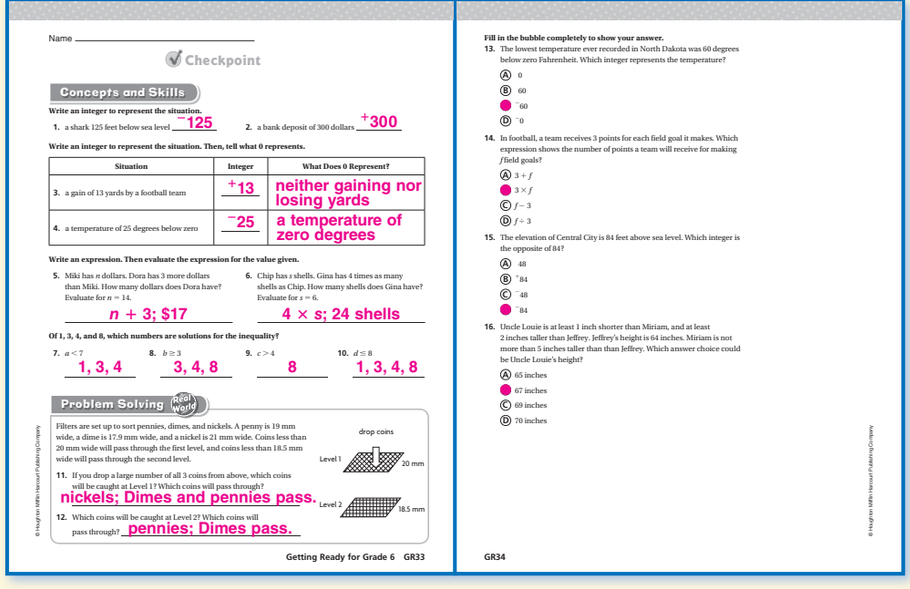
Problem Solving Real World

Possible answers are shown. Check students' number lines.

11. For her birthday party, Dina wants to invite at least 8 guests but not more than 12 guests. How many guests might she have? Name all of the possibilities.

Dina can have 8, 9, 10, 11, or 12 guests.

Getting Ready Lessons and Resources, pp. GR33–GR34 Checkpoint



Name _____

Checkpoint

Concepts and Skills

Write an integer to represent the situation.

1. a shark 125 feet below sea level: $^{-}125$
2. a bank deposit of 300 dollars: $^{+}300$

Write an integer to represent the situation. Then, tell what 0 represents.

Situation	Integer	What Does 0 Represent?
3. a gain of 13 yards by a football team	$^{+}13$	neither gaining nor losing yards
4. a temperature of 25 degrees below zero	$^{-}25$	a temperature of zero degrees

Write an expression. Then evaluate the expression for the value given.

5. Miki has n dollars. Dora has 3 more dollars than Miki. How many dollars does Dora have? Evaluate for $n = 14$. — $n + 3$; \$17
6. Chip has s shells. Gina has 4 times as many shells as Chip. How many shells does Gina have? Evaluate for $s = 6$. — $4 \times s$; 24 shells

Of 1, 3, 4, and 8, which numbers are solutions for the inequality?

7. $a < 7$ — 1, 3, 4
8. $b \geq 3$ — 3, 4, 8
9. $c > 4$ — 8
10. $d \leq 8$ — 1, 3, 4, 8

Problem Solving Real World

Filters are set up to sort pennies, dimes, and nickels. A penny is 19 mm wide, a dime is 17.9 mm wide, and a nickel is 21 mm wide. Coins less than 20 mm wide will pass through the first level, and coins less than 18.5 mm wide will pass through the second level.

11. If you drop a large number of all 3 coins from above, which coins will be caught at Level 1? Which coins will pass through? — nickels; Dimes and pennies pass.
12. Which coins will be caught at Level 2? Which coins will pass through? — pennies; Dimes pass.

Fill in the bubble completely to show your answer.

13. The lowest temperature ever recorded in North Dakota was 60 degrees below zero Fahrenheit. Which integer represents the temperature?
   (A) 0
   (B) 60
   (C) $^{-}60$
   (D) $^{-}0$
14. In football, a team receives 3 points for each field goal it makes. Which expression shows the number of points a team will receive for making f field goals?
   (A) $3 + f$
   (B) $3 \times f$
   (C) $f - 3$
   (D) $f \div 3$
15. The elevation of Central City is 84 feet above sea level. Which integer is the opposite of 84?
   (A) 48
   (B) $^{-}84$
   (C) $^{-}48$
   (D) $^{+}84$
16. Uncle Louie is at least 1 inch shorter than Miriam, and at least 2 inches taller than Jeffrey. Jeffrey's height is 64 inches. Miriam is not more than 5 inches taller than Jeffrey. Which answer choice could be Uncle Louie's height?
   (A) 65 inches
   (B) 67 inches
   (C) 69 inches
   (D) 70 inches

2 PRACTICE

MATH BOARD

Share and Show • Guided Practice

Remind students to use the number line so that they can see a graphic representation of the solutions.

On Your Own • Independent Practice

Students may choose to draw number lines for each response. For Exercises 4, 6, and 9, remind students of the meanings of these symbols.

Problem Solving Math Processes and Practices

Encourage students to write an inequality that describes the correct responses.

3 SUMMARIZE

Math Processes and Practices

Essential Question

How can you use inequalities to solve problems? First, write an inequality using words. Then, replace key terms with variables. Use a number line to find the true solutions.

Math Journal WRITE Math

Explain how you can decide which of 5, 7, and 9 are solutions of $k \geq 7$.

LESSON 15

Polygons on a Coordinate Grid

LESSON AT A GLANCE

Lesson Objective
Plot polygons on a coordinate grid.

Materials
MathBoard

This lesson builds on graphing in quadrant I of the coordinate plane presented in Chapter 9, and prepares students to graph points for the vertices of a polygon in the coordinate plane taught in Grade 6.

1 TEACH and TALK

Unlock the Problem

Math Processes and Practices

Have students read the problem.

- **How do you decide where to plot the point (10, 1)?** I start at (0, 0). I go right 10 units, and then up 1 unit.
- **Are the points (6, 10) and (10, 6) the same points? Explain.** No. Possible explanation: (6, 10) is 6 units to the right of (0, 0) and 10 units up. (10, 6) is 10 units to the right of (0, 0) and 6 units up.
- **What if the two vertices (2, 1) and (2, 6) were replaced by a single vertex at (6, 1). What would the shape of the floor be?** a trapezoid
- **(0, 0) is the vertex of the right angle of a right triangle plotted on a coordinate grid. Give two points that could form the other two vertices.** Possible answer: (4, 0) and (0, 4) Students' answers should include a point on the *x*-axis and a point on the *y*-axis.

Use Math Talk to focus on students' understanding of lesson concepts.

Name _____

Polygons on a Coordinate Grid

Essential Question How can you plot polygons on a coordinate grid?

Connect You have learned to plot points on a coordinate grid. You can use that skill to plot polygons on a coordinate grid.

Unlock the Problem (Real World)

Camille is designing an indoor greenhouse on a coordinate grid. The floor of the greenhouse is a polygon. The vertices of the polygon can be graphed using the coordinates shown in the table. Plot and describe the floor of the greenhouse.

x	y
10	1
2	6
2	1
6	10
10	6

- What do *x* and *y* represent in the table? **Each (x, y) pair represents the x- and y-coordinates of a point.**

Plot the polygon on a coordinate grid.

STEP 1 Write ordered pairs.

Use each row of the table to write an ordered pair.

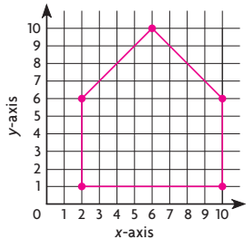
(10, 1), (2, 6), (2, 1), (6, 10), (10, 6).

STEP 2 Graph a point for each pair on the coordinate grid.

STEP 3 Connect the points.

So, the floor of the greenhouse is a pentagon.

- **What if** the greenhouse floor had only four of the five vertices given in the table and did not include (6, 10). What would the shape of the floor be? a rectangle



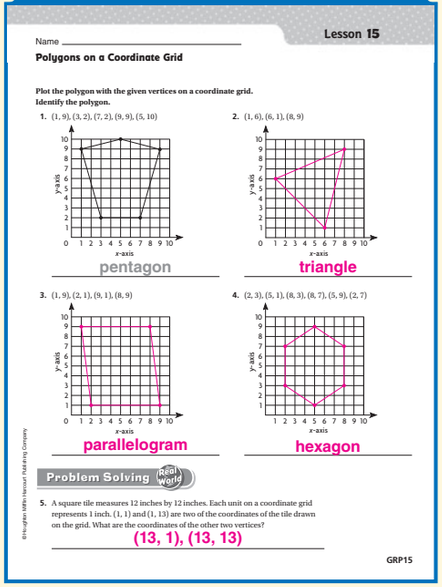
- A parallelogram on a coordinate grid has vertices at (3, 4), (6, 1), and (8, 4). What are the coordinates of the fourth vertex? **Explain** how you found the answer. **(1, 1), (5, 7), or (11, 1); Possible answer: I plotted the three points on a coordinate grid and joined them to make three sides of a parallelogram. I used the shape to find the fourth vertex.**

Possible answer: The number of sides equal the number of vertices.

Math Talk Mathematical Practices

Suppose you know the vertices of a polygon. How can you identify what type of polygon it is without plotting the vertices on a coordinate grid?

GR: Practice, p. GRP15



Name _____ Lesson 15

Polygons on a Coordinate Grid

Plot the polygon with the given vertices on a coordinate grid. Identify the polygon.

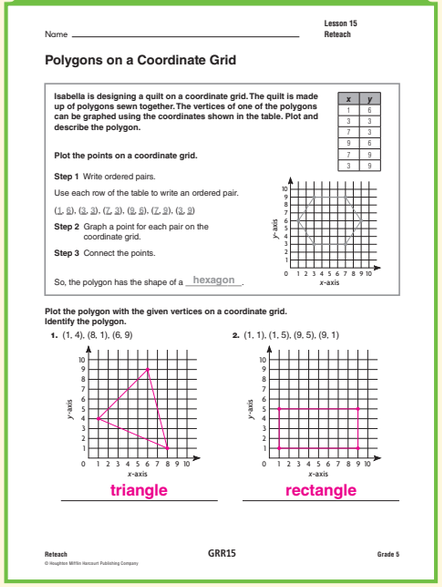
1. (1, 9), (3, 2), (7, 2), (9, 9), (5, 10) — pentagon
2. (1, 6), (6, 1), (8, 9) — triangle
3. (1, 9), (2, 1), (9, 1), (8, 9) — parallelogram
4. (2, 3), (5, 1), (8, 3), (8, 7), (5, 9), (2, 7) — hexagon

Problem Solving (Real World)

5. A square tile measures 12 inches by 12 inches. Each unit on a coordinate grid represents 1 inch. (1, 1) and (1, 13) are two of the coordinates of the tile drawn on the grid. What are the coordinates of the other two vertices? (13, 1), (13, 13)

GRP15

GR: Reteach, p. GRR15



Name _____ Lesson 15 Reteach

Polygons on a Coordinate Grid

Isabella is designing a quilt on a coordinate grid. The quilt is made up of polygons sewn together. The vertices of one of the polygons can be graphed using the coordinates shown in the table. Plot and describe the polygon.

x	y
1	6
3	3
7	3
9	6
7	9
3	9

Plot the points on a coordinate grid.

Step 1 Write ordered pairs.

Use each row of the table to write an ordered pair.

(1, 6), (3, 3), (7, 3), (9, 6), (7, 9), (3, 9)

Step 2 Graph a point for each pair on the coordinate grid.

Step 3 Connect the points.

So, the polygon has the shape of a hexagon.

Plot the polygon with the given vertices on a coordinate grid. Identify the polygon.

1. (1, 4), (8, 1), (6, 9) — triangle
2. (1, 1), (1, 5), (9, 5), (9, 1) — rectangle

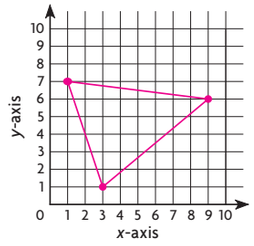
Reteach GRR15 Grade 5

*GR – Getting Ready Lessons and Resources (*www.thinkcentral.com*)

Share and Show

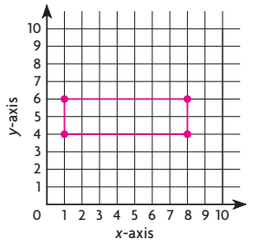
Plot the polygon with the given vertices on a coordinate grid.
Identify the polygon.

1. (9, 6), (1, 7), (3, 1)



triangle

2. (1, 6), (8, 4), (1, 4), (8, 6)

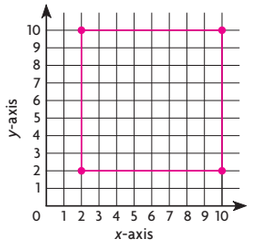


rectangle

On Your Own

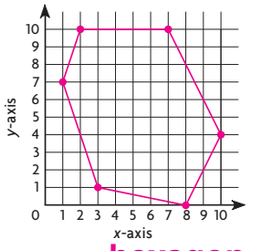
Plot the polygon with the given vertices on a coordinate grid.
Identify the polygon.

3. (2, 10), (10, 2), (10, 10), (2, 2)



square

4. (10, 4), (2, 10), (3, 1), (8, 0), (7, 10), (1, 7)



hexagon

Problem Solving

5. A football field is a rectangle measuring 300 ft by 160 ft. Each unit on a coordinate grid represents 1 foot. (0, 0) and (0, 160) are two of the coordinates of a football field drawn on the grid. What are the coordinates of the other two vertices?

(300, 0) and (300, 160)

2 PRACTICE

Share and Show • Guided Practice

Some students may need to be reminded that the first number of a coordinate pair is the *x*-coordinate and the second number is the *y*-coordinate.

On Your Own • Independent Practice

For Exercise 4, be sure students understand that they should plot the point (8, 0) on the *x*-axis.

Problem Solving Math Processes and Practices

You may wish to suggest that students draw the football field on a coordinate grid where each unit represents 20 feet.

3 SUMMARIZE

Math Processes and Practices

Essential Question

How can you plot polygons on a coordinate grid? Possible answer: write the ordered pairs representing the vertices of the polygon. Graph a point for each pair on the coordinate grid. Then connect the points to form the polygon.

Math Journal WRITE Math

Draw a triangle on a coordinate grid. Write the ordered pairs that represent the vertices of the triangle and explain how you found each ordered pair on the coordinate grid.

LESSON 16

Area of a Parallelogram

LESSON AT A GLANCE

Lesson Objective
Find the area of parallelograms.

Materials
MathBoard, grid paper (see *eTeacher Resources*), scissors

GO DIGITAL Animated Math Models

1 TEACH and TALK

GO DIGITAL • Animated Math Models

Activity

Math Processes and Practices

Have students read the activity.

- **Describe how you will draw the parallelogram.** Possible answer: I will draw the lower base of the parallelogram, making it 12 units long. From the left end of the base I will count 3 units right and then 5 units up and mark a point. From that point I will draw the upper base of the parallelogram, making it 12 units long. Finally, I will connect the endpoints of the bases to make the sides of the parallelogram.
- **A student found the height of the rectangle by measuring the length of the slanting left side of the parallelogram. Was the student right? Explain.** No. Possible explanation: The height of the rectangle is the length of a line drawn perpendicular to the base, not on a slant from the base.
- **If you know the base and height of a parallelogram, do you have to draw it on grid paper, cut off one end, and make a rectangle in order to find its area? Explain.** No. I can find the area by multiplying the base times the height.

Use **Math Talk** to help students recognize that the area of a parallelogram can be found by multiplying the base times the height.

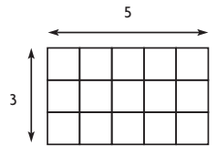
This lesson builds on finding area of rectangles in Grade 4, and prepares students for finding the area of a parallelogram taught in Grade 6.

Name _____

Area of a Parallelogram

Essential Question How can you find the area of a parallelogram?

Connect You have learned that the area of a rectangle with base b and height h is $A = b \times h$. The rectangle shown has a base of 5 units and a height of 3 units. So, its area is $A = 5 \times 3 = 15$ square units. You can use what you have learned about the area of a rectangle to find the area of a parallelogram.



Unlock the Problem (Real World)

The souvenir stand at Mighty Grasshopper basketball games sells parallelogram-shaped pennants. Each pennant has a base of 12 inches and a height of 5 inches.

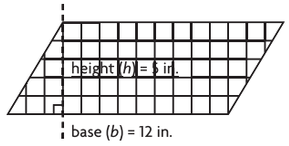
Activity **Find the area of the parallelogram.**

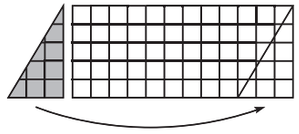
Materials ■ grid paper ■ scissors

STEP 1 Draw the parallelogram on grid paper and cut it out.

STEP 2 Cut along the dashed line to remove a right triangle.

STEP 3 Move the right triangle to the right side of the parallelogram to form a rectangle.





STEP 4 The base of the rectangle measures 12 inches.

The height of the rectangle measures 5 inches.

The area of the rectangle is $12 \times 5 = 60$ square inches.

- **Explain** why the area of the parallelogram must equal the area of the rectangle.

Possible explanation: Both figures are made from the same amount of paper.

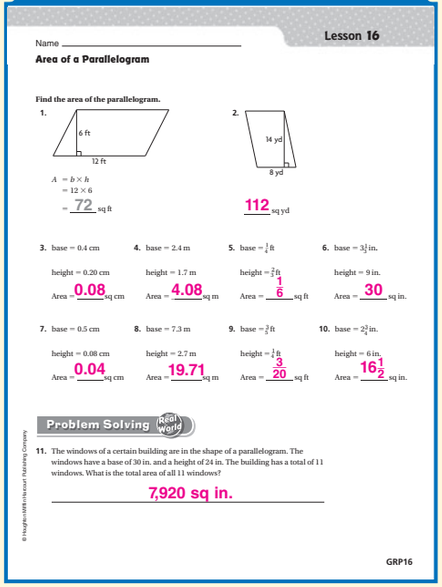
Possible explanation: Multiply the base times the height.

So, the area of a pennant is $12 \times 5 = 60$ square inches.

Math Talk Mathematical Practices

Explain how to find the area of a parallelogram if you know the base and the height of the figure.

GR: Practice, p. GRP16



Name _____ Lesson 16

Area of a Parallelogram

Find the area of the parallelogram.

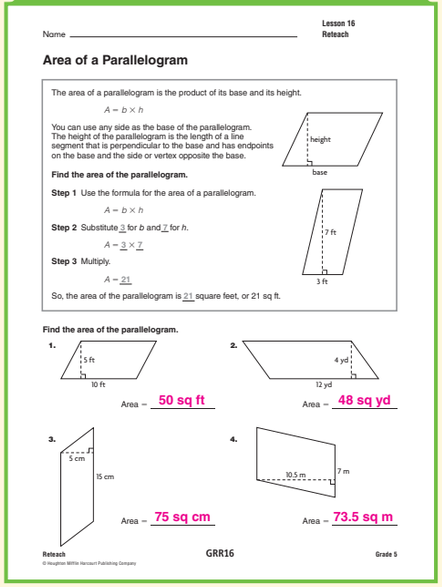
1. 6 ft, 12 ft. $A = b \times h$ $= 12 \times 6$ $= 72$ sq ft
2. 14 yd, 8 yd. 112 sq yd
3. base = 0.4 cm, height = 0.20 cm, Area = 0.08 sq cm
4. base = 2.4 m, height = 1.7 m, Area = 4.08 sq m
5. base = $\frac{1}{4}$ ft, height = $\frac{2}{3}$ ft, Area = $\frac{1}{6}$ sq ft
6. base = $3\frac{1}{3}$ in., height = 9 in., Area = 30 sq in.
7. base = 0.5 cm, height = 0.08 cm, Area = 0.04 sq cm
8. base = 7.3 m, height = 2.7 m, Area = 19.71 sq m
9. base = $\frac{2}{5}$ ft, height = $\frac{1}{2}$ ft, Area = $\frac{3}{20}$ sq ft
10. base = $2\frac{2}{3}$ in., height = 6 in., Area = $16\frac{1}{2}$ sq in.

Problem Solving (Real World)

11. The windows of a certain building are in the shape of a parallelogram. The windows have a base of 30 in. and a height of 24 in. The building has a total of 11 windows. What is the total area of all 11 windows? 7,920 sq in.

GRP16

GR: Reteach, p. GRR16



Name _____ Lesson 16 Reteach

Area of a Parallelogram

The area of a parallelogram is the product of its base and its height.

$A = b \times h$

You can use any side as the base of the parallelogram. The height of the parallelogram is the length of a line segment that is perpendicular to the base and has endpoints on the base and the side or vertex opposite the base.

height, base

Find the area of the parallelogram.

Step 1 Use the formula for the area of a parallelogram. $A = b \times h$

Step 2 Substitute 3 for b and 7 for h. $A = 3 \times 7$

Step 3 Multiply. $A = 21$

So, the area of the parallelogram is 21 square feet, or 21 sq ft.

7 ft, 3 ft

Find the area of the parallelogram.

1. 5 ft, 10 ft. Area = 50 sq ft
2. 4 yd, 12 yd. Area = 48 sq yd
3. 5 cm, 15 cm. Area = 75 sq cm
4. 10.5 m, 7 m. Area = 73.5 sq m

Reteach GRR16 Grade 5

*GR – Getting Ready Lessons and Resources (*www.thinkcentral.com*)

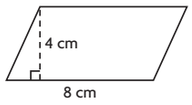
Share and Show

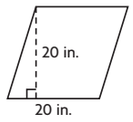
Find the area of the parallelogram.

1. $A = b \times h$

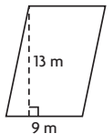
   $A = 8 \times 4$

   $A =$ 32 sq cm

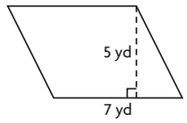


2. 

   $A =$ 400 sq in.

3. 

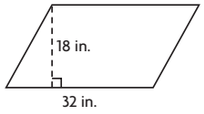
   $A =$ 117 sq m

4. 

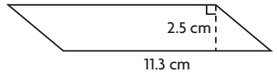
   $A =$ 35 sq yd

On Your Own

Find the area of the parallelogram.

5. 

   $A =$ 576 sq in.

6. 

   $A =$ 28.25 sq cm

7. base = 0.6 cm

   height = 0.15 cm

   $A =$ 0.09 sq cm

8. base = 1.8 m

   height = 2.9 m

   $A =$ 5.22 sq m

9. base = $\frac{1}{2}$ ft

   height = $\frac{3}{8}$ ft

   $A =$ $\frac{3}{16}$ sq ft

10. base = $4\frac{1}{4}$ in.

    height = 20 in.

    $A =$ 85 sq in.

Problem Solving

11. Carla made a border for her garden using parallelogram-shaped tiles. Each piece had a base of 4 in. and a height of $2\frac{1}{2}$ in. She used 85 tiles. What was the total area of the border?

    850 sq in.

2 PRACTICE

Share and Show • Guided Practice

For Exercise 3, you may wish to point out that the base of a parallelogram does not have to be longer than the height. Remind students that they can find the area of a parallelogram by multiplying the base and height, as long as they know the length of one side and the height drawn perpendicular to that side.

On Your Own • Independent Practice

Use Exercises 7–10 as a check on students' skills of finding the product of two decimals, two fractions, and a mixed number and a whole number.

Problem Solving

Math Processes and Practices

Exercise 11 is a multi-step problem. Students must first find the area of a single tile ($4 \text{ in.} \times 2\frac{1}{2} \text{ in.} = 10 \text{ in.}^2$). Then, because there are 85 tiles, they should multiply the product by 85 ($10 \text{ in.}^2 \times 85 = 850 \text{ in.}^2$).

3 SUMMARIZE

Math Processes and Practices

Essential Question

How can you find the area of a parallelogram?

I can multiply the base times the height.

Math Journal

Ronnie drew a parallelogram on grid paper. She cut off one end of the parallelogram and moved it to the other side to form a rectangle. Explain why the areas of the rectangle and the parallelogram were equal.

GETTING READY FOR GRADE 6

LESSON 17

Median and Mode

LESSON AT A GLANCE

Lesson Objective
Summarize a data set by using median and mode.

Materials
MathBoard

GO DIGITAL Animated Math Models

1 TEACH and TALK

GO DIGITAL • Animated Math Models

Unlock the Problem

Math Processes and Practices

Discuss the new vocabulary.

- **Blake said that the median of the data set 3, 8, 2 is 8 because 8 is the middle value. Was he right? Explain.** No. Possible explanation: He didn't write the data in order before looking for the middle value. Written in order, the data set is 2, 3, 8. The median is the middle value, 3.
- **What is the median of the data set 1, 3, 5, 7? Why?** 4; Possible answer: There is an even number of values in the data set, so the median is the sum of the two middle items divided by 2; (3 + 5) ÷ 2 = 8 ÷ 2 = 4.
- **Give an example of a data set with no mode.** Possible answer: no mode: 5, 6, 7, 8
- **Estimate the mode of the data set consisting of the ages of all the students in the classroom.** Answers will vary. Students should estimate what they believe to be the most common age of the set of their classmates' ages.

This lesson builds on analyzing data using operations presented in Chapter 9, and prepares students for describing quantitative measures in data taught in Grade 6.

Name _____

Median and Mode

Essential Question How can you describe a set of data using median and mode?

The **median** of a set of data is the middle value when the data are written in order. For example, a baseball team scored 6, 2, 6, 0, and 3 runs in five games. The median is 3 runs: 0, 2, (3), 6, 6.

If there is an even number of data items, the median is the sum of the two middle items divided by 2.

The **mode** of a data set is the data value or values that occur most often. A data set may have no mode, one mode, or several modes. The mode of the data set of baseball runs is 6.

Unlock the Problem Real World

For the Science Fair, Ronni grew 9 sweet pea plants under different conditions. Here are the plants' heights, in centimeters: 11, 13, 6, 9, 15, 7, 9, 17, 12.

What are the median and mode of the data?

- How can you find the median if there is an even number of data items? **Divide the sum of the two middle items by 2.**

Find the median and mode.

STEP 1 Order the heights from least to greatest.

6, 7, 9, 9, (11), 12, 13, 15, 17

STEP 2 Circle the middle value.

So, the median is 11 centimeters.

STEP 3 Identify the data value that occurs most often. 9 occurs two times.

So, the mode is 9 centimeters.

Math Talk Mathematical Practices

Give an example of a data set with two modes.

Try This! **Find the median and mode of the numbers: 8, 11, 13, 6, 4, 3.**

STEP 1 Order the numbers from least to greatest.

3, 4, 6, 8, 11, 13

STEP 2 There is an even number of data items, so divide the sum of the two middle items by 2. $\frac{6 + 8}{2} = \frac{14}{2} = 7$

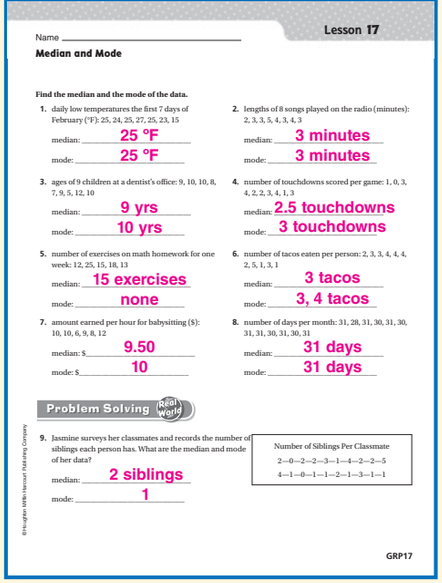
So, the median is = 7.

STEP 3 No data value appears more than once.

So, the data set has no mode.

Possible answer: 5, 6, 6, 6, 7, 8, 8, 8

GR: Practice, p. GRP17



Name _____ Lesson 17

Median and Mode

Find the median and the mode of the data.

1. daily low temperatures the first 7 days of February (°F): 25, 24, 25, 27, 25, 23, 15
   median: 25 °F
   mode: 25 °F
2. lengths of 8 songs played on the radio (minutes): 2, 3, 3, 5, 4, 3, 4, 3
   median: 3 minutes
   mode: 3 minutes
3. ages of 9 children at a dentist's office: 9, 10, 10, 8, 7, 9, 5, 12, 10
   median: 9 yrs
   mode: 10 yrs
4. number of touchdowns scored per game: 1, 0, 3, 4, 2, 2, 3, 4, 1, 3
   median: 2.5 touchdowns
   mode: 3 touchdowns
5. number of exercises on math homework for one week: 12, 25, 15, 18, 13
   median: 15 exercises
   mode: none
6. number of tacos eaten per person: 2, 3, 3, 4, 4, 4, 2, 5, 1, 3, 1
   median: 3 tacos
   mode: 3, 4 tacos
7. amount earned per hour for babysitting ($): 10, 10, 6, 9, 8, 12
   median: $9.50
   mode: $10
8. number of days per month: 31, 28, 31, 30, 31, 30, 31, 31, 30, 31, 30, 31
   median: 31 days
   mode: 31 days

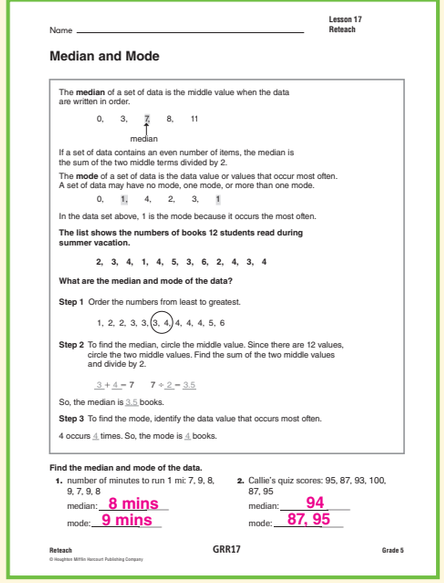
Problem Solving Real World

9. Jasmine surveys her classmates and records the number of siblings each person has. What are the median and mode of her data?
   median: 2 siblings
   mode: 1

Number of Siblings Per Classmate
2—0—2—2—3—1—4—2—2—5
4—1—0—1—1—2—1—3—1—1

GRP17

GR: Reteach, p. GRR17



Name _____ Lesson 17 Reteach

Median and Mode

The **median** of a set of data is the middle value when the data are written in order.

0, 3, 7, 8, 11

median

If a set of data contains an even number of items, the median is the sum of the two middle terms divided by 2.

The **mode** of a set of data is the data value or values that occur most often. A set of data may have no mode, one mode, or more than one mode.

0, 1, 4, 2, 3, 1

In the data set above, 1 is the mode because it occurs the most often.

The list shows the numbers of books 12 students read during summer vacation.

2, 3, 4, 1, 4, 5, 3, 6, 2, 4, 3, 4

What are the median and mode of the data?

Step 1 Order the numbers from least to greatest.

1, 2, 2, 3, 3, (3, 4), 4, 4, 5, 6

Step 2 To find the median, circle the middle value. Since there are 12 values, circle the two middle values. Find the sum of the two middle values and divide by 2.

3 + 4 = 7 7 ÷ 2 = 3.5

So, the median is 3.5 books.

Step 3 To find the mode, identify the data value that occurs most often.

4 occurs 4 times. So, the mode is 4 books.

Find the median and mode of the data.

1. number of minutes to run 1 mi: 7, 9, 8, 9, 7, 9, 8
   median: 8 mins
   mode: 9 mins
2. Callie's quiz scores: 95, 87, 93, 100, 87, 95
   median: 94
   mode: 87, 95

Reteach GRR17 Grade 5

*GR – Getting Ready Lessons and Resources (*www.thinkcentral.com*)

Share and Show

MATH BOARD

Find the median and the mode of the data.

1. puppies' weights (pounds): 8, 3, 5, 3, 2, 6, 3
   Order the weights: 2, 3, 3, 3, 5, 6, 8
   The median, or middle value, is 3 pounds
   The mode, or most common value, is 3 pounds.

2. numbers of students in math classes: 25, 21, 22, 18, 23, 24, 25
   median: 23 students
   mode: 25 students

3. numbers of 3-point baskets made: 2, 0, 5, 4, 5, 2, 5, 2
   median: 3 3-point baskets
   mode: 2, 5 3-point baskets

4. movie ticket prices ($): 8, 8, 6, 8, 7, 6, 8, 10, 8, 6
   median: $8
   mode: $8

On Your Own

Find the median and the mode of the data.

5. ages of first 10 U.S. presidents when inaugurated: 57, 61, 57, 57, 58, 57, 61, 54, 68, 51
   median: 57 years
   mode: 57 years

6. weights of rock samples (pounds): 39, 28, 21, 47, 40, 33
   median: 36 pounds
   mode: none pounds

7. lengths of humpback whale songs (minutes): 25, 29, 31, 22, 33, 31, 26, 22
   median: 27.5 minutes
   mode: 22, 31 minutes

8. Sascha's test scores: 90, 88, 79, 97, 100, 97, 92, 88, 85, 92
   median: 91
   mode: 88, 92, 97

Problem Solving Real World

9. Adrian recorded the daily high temperatures the first two weeks of July. What were the median and mode of her data?
   median: 99.5 °F
   mode: 98 °F

Daily High Temperatures (°F)						
101	99	98	96	102	101	98
101	98	95	100	102	98	102

2 PRACTICE

MATH BOARD

Share and Show • Guided Practice

Encourage students to check each ordered set of data that they write to be sure that they have included every item from the original data set in their ordered set exactly once.

On Your Own • Independent Practice

The data sets in Exercises 5–8 all have even numbers of items. To find the median of any set whose middle two items are different, students should divide the sum of the two items by 2.

Problem Solving Math Processes and Practices

Ask students how they could change one temperature so that there would be two modes. Possible changes: change 95 to 101 or 102.

3 SUMMARIZE

Math Processes and Practices

Essential Question

How can you describe a set of data using median and mode? Possible answer: In a set of data, the median is the middle value when all values are placed in order. If there is an even number of values, the two middle values are added and divided by 2. The mode is the value or values that occurs most often.

Math Journal WRITE Math

Explain how to find the median and mode of the data set {3, 7, 6, 1, 7}.

LESSON 18

Finding the Average

LESSON AT A GLANCE

Lesson Objective
Find the average of a group of values.

Materials
calculators, MathBoard

GO DIGITAL Animated Math Models

1 TEACH and TALK

GO DIGITAL • Animated Math Models

Unlock the Problem

Math Processes and Practices

Help students understand how to use division to find the average of a group of numbers.

Distribute calculators to pairs of students, and review basic operations with the calculator.

Discuss the meaning of the term *average*. Clarify with students that an average is the number that can be considered to be typical of a set of numbers.

Have students look at the list of numbers in the table on GR41, and ask them to predict the average.

- **Add the numbers in the column. What is the sum?** 170
- **How many numbers are there?** 5 **What is the quotient when you divide 170 by 5?** 34 **So 34 is the average of this group of numbers.**

Use Math Talk to focus on students' understanding of lesson concepts.

This lesson builds on analyzing data presented in Chapter 9, and prepares students for describing quantitative measures in data taught in Grade 6.

Name _____

Finding the Average

Essential Question How can you find the average of a set of values?

An average of a set of data can be found by finding the sum of the group of numbers from the data and then dividing by the number of addends.

For example, if Anne scores 21 points, 22 points, and 17 points in 3 different basketball games, she scores an average of 20 points per game. This is because $21 + 22 + 17 = 60$, and $60 \div 3$, the total number of points divided by the number of games, is 20.

Unlock the Problem Real World

Jonathon and Pilar are practicing to be a juggling team. The table shows the number of seconds they were able to keep 4 balls in the air without making a mistake. What was the average number of seconds they were able to juggle?

Trial	Seconds
a	32
b	8
c	62
d	55
e	13

- How many trials did they record? 5

Find the average of the times.

STEP 1 Find the sum of the seconds. $32 + 8 + 62 + 55 + 13 = 170$

STEP 2 How many numbers did you add? 5 numbers

STEP 3 Divide the sum by the number of addends. $5\overline{)170}$ → 34

So, the average time that Jonathon and Pilar kept 4 balls in the air was 34 seconds per trial.

Try This! **Find the average of 61, 99, 106, 3, 44, and 89.**

STEP 1 Find the sum.

$61 + 99 + 106 + 3 + 44 + 89 =$ 402

STEP 2 Divide the sum by the number of addends.

$402 \div 6 =$ 67

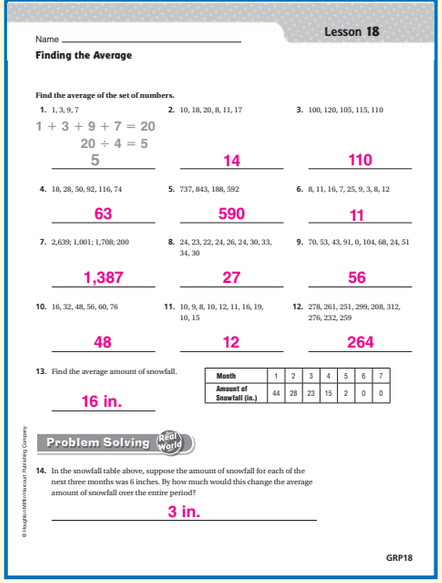
So, the average of 61, 99, 106, 3, 44, and 89 is 67.

Possible answer: They might juggle for about 34 seconds before they make a mistake.

Math Talk **Mathematical Practices**

Use the jugglers' average time per trial. What might you expect of them in their next trial?

GR: Practice, p. GRP18



Name _____ Lesson 18

Finding the Average

Find the average of the set of numbers.

1. 1, 3, 9, 7
   $1 + 3 + 9 + 7 = 20$
   $20 \div 4 = 5$
   5
2. 10, 18, 20, 8, 11, 17 — 14
3. 100, 120, 105, 115, 110 — 110
4. 18, 28, 50, 92, 116, 74 — 63
5. 737, 843, 188, 592 — 590
6. 8, 11, 16, 7, 25, 9, 3, 8, 12 — 11
7. 2,639; 1,001; 1,708; 200 — 1,387
8. 24, 23, 22, 24, 26, 24, 30, 33, 34, 30 — 27
9. 70, 53, 43, 91, 0, 104, 68, 24, 51 — 56
10. 16, 32, 48, 56, 60, 76 — 48
11. 10, 9, 8, 10, 12, 11, 16, 19, 10, 15 — 12
12. 278, 261, 251, 299, 208, 312, 276, 232, 259 — 264
13. Find the average amount of snowfall. — 16 in.

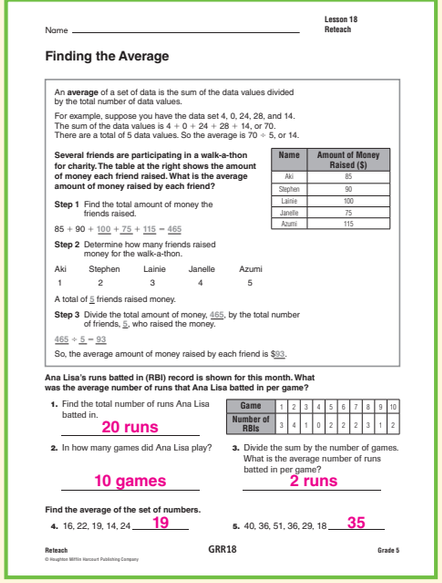
Month	1	2	3	4	5	6	7
Amount of Snowfall (in.)	44	28	23	15	2	0	0

Problem Solving Real World

14. In the snowfall table above, suppose the amount of snowfall for each of the next three months was 6 inches. By how much would this change the average amount of snowfall over the entire period? 3 in.

GRP18

GR: Reteach, p. GRR18



Name _____ Lesson 18 Reteach

Finding the Average

An **average** of a set of data is the sum of the data values divided by the total number of data values.

For example, suppose you have the data set 4, 0, 24, 28, and 14. The sum of the data values is $4 + 0 + 24 + 28 + 14$, or 70. There are a total of 5 data values. So the average is $70 \div 5$, or 14.

Several friends are participating in a walk-a-thon for charity. The table at the right shows the amount of money each friend raised. What is the average amount of money raised by each friend?

Name	Amount of Money Raised ($)
Aki	85
Stephen	90
Lainie	100
Janelle	75
Azumi	115

Step 1 Find the total amount of money the friends raised.

$85 + 90 + 100 + 75 + 115 = 465$

Step 2 Determine how many friends raised money for the walk-a-thon.

Aki	Stephen	Lainie	Janelle	Azumi
1	2	3	4	5

A total of 5 friends raised money.

Step 3 Divide the total amount of money, 465, by the total number of friends, 5, who raised the money.

$465 \div 5 = 93$

So, the average amount of money raised by each friend is $93.

Ana Lisa's runs batted in (RBI) record is shown for this month. What was the average number of runs that Ana Lisa batted in per game?

Game	1	2	3	4	5	6	7	8	9	10
Number of RBIs	3	4	1	0	2	2	2	3	1	2

1. Find the total number of runs Ana Lisa batted in. — 20 runs
2. In how many games did Ana Lisa play? — 10 games
3. Divide the sum by the number of games. What is the average number of runs batted in per game? — 2 runs

Find the average of the set of numbers.

4. 16, 22, 19, 14, 24 — 19
5. 40, 36, 51, 36, 29, 18 — 35

Reteach GRR18 Grade 5

*GR – Getting Ready Lessons and Resources (*www.thinkcentral.com*)

Share and Show

Tommy's basketball scoring record is shown for this month. What was the average number of points that Tommy scored per game?

Game	1	2	3	4	5	6	7	8
Points	24	11	31	14	9	21	18	8

1a. Find the sum of the points Tommy scored.

136 points

1b. How many numbers did you add to find the sum in Exercise 1?

8

1c. Divide the sum by the number of games. What is the average number of points per game?

17 points

Find the average of the set of numbers.

2. 6, 9, 14, 4, 12

9

3. 44, 55, 33, 22, 40, 40

39

On Your Own

Find the average of the set of numbers.

4. 4, 8, 12, 14, 15, 19

12

5. 28, 20, 31, 17

24

6. 100, 140, 60, 120, 180

120

7. 17, 91, 49, 73, 115, 27

62

8. 5, 8, 13, 4, 22, 6, 0, 5, 9

8

9. 637, 492, 88, 743

490

10. 2,439; 801; 1,508; 0

1,187

11. 13, 12, 11, 13, 15, 13, 19, 22, 13, 19

15

12. 78, 61, 51, 99, 8, 112, 76, 32, 59

64

13. Find the average temperature.

52°F

Day	1	2	3	4	5	6	7
Temperature (°F)	48	59	38	53	61	61	44

Problem Solving

14. In the temperature table above, suppose the temperature for the next 2 days was 70 degrees. By how much would this change the average temperature over the entire period?

4 degrees

2 PRACTICE

Share and Show • Guided Practice

Remind students to check their average to see if it makes sense: **Does the average number look "typical" of that group of numbers?**

On Your Own • Independent Practice

Encourage students to practice addition and division skills by completing problems with paper and pencil and estimating to check.

Problem Solving Math Processes and Practices

Help students break the problem into steps by first calculating the average of the existing group of numbers, and then calculating a new average by including 70 and 70.

3 SUMMARIZE

Math Processes and Practices

Essential Question

How can you find the average of a set of values? Find the sum of the numbers. Count how many numbers are in the set. Divide the sum by the number of addends.

Math Journal WRITE Math

The ages of the five members of the Garcia family are 6, 41, 9, 11, and 43. What is the average age of the family members? Explain how you found the answer.

LESSON 19

Histograms

LESSON AT A GLANCE

Lesson Objective
Make a histogram to organize data.

Vocabulary
histogram

GO DIGITAL Animated Math Models

1 TEACH and TALK

GO DIGITAL • Animated Math Models

Activity Math Processes and Practices

Have students read the Activity.

- **What are the ages of the youngest and oldest members of the bicycle club?** 17; 59
- **How does knowing the ages of the youngest and oldest members help you organize the data?** Possible answer: It helps in choosing reasonable intervals for the frequency table.
- **How does knowing the number of members in each age interval help you make the histogram?** Possible answer: It helps to choose an appropriate scale and interval for the vertical axis of the histogram.
- **How can you check that you have included each member of the bicycle club in the histogram?** Possible answer: The sum of the values represented by the bars should be 28 since there are 28 members in the bicycle club.

Use Math Talk to check students' understanding of how a histogram and bar graph are different.

This lesson builds on bar graphs presented in Grade 3, and prepares students for displaying data in a histogram taught in Grade 6.

Name _____

Histograms

Essential Question How can you use a histogram to organize data?

Unlock the Problem Real World

Activity The table below shows the ages of the members of a bicycle club. Make a **histogram** of the data. A histogram is a bar graph that shows how often data occur in intervals.

Math Idea
In a histogram, the bars touch because they represent continuous intervals.

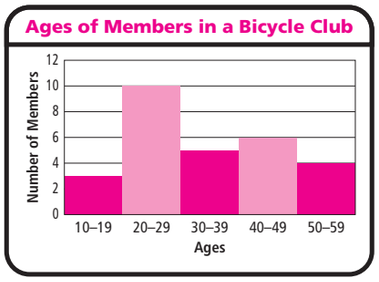
Ages of Members in a Bicycle Club													
34	38	29	41	40	35	50	20	47	22	19	21	18	17
26	30	41	43	52	45	28	25	39	24	23	25	50	59

STEP 1 Make a frequency table with intervals of 10. Fill in the frequencies.

STEP 2 Choose an appropriate scale and interval for the vertical axis, and list the intervals on the horizontal axis. Label each axis.

STEP 3 Draw a bar for each interval. Give the histogram a title.

Ages	Tally	Frequency
10–19	|||	3
20–29	𝍸 |||	10
30–39	𝍸	5
40–49	𝍸 |	6
50–59	|||	4



- **What if** you changed the histogram to show four age groups with 12-year intervals?

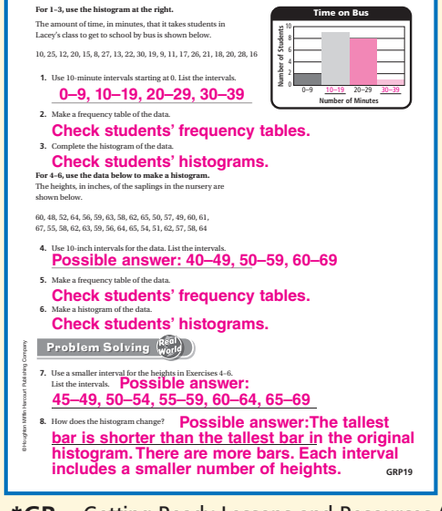
How would the histogram change?

Possible answer: There would only be 4 bars but the frequencies would still add up to the same number. Each interval would include more ages.

Possible explanation: In a bar graph with categories, there are spaces between the bars. A histogram shows frequencies, and there is no space between the bars.

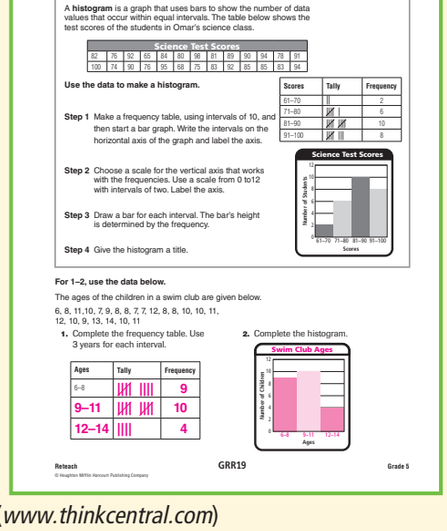
Math Talk Mathematical Practices
Explain how a histogram and a bar graph with categories are different.

GR: Practice, p. GRP19


Name _____ Lesson 19
Histograms
For 1–3, use the histogram at the right.
The amount of time, in minutes, that it takes students in Lacey's class to get to school by bus is shown below.
10, 25, 12, 20, 15, 8, 27, 13, 22, 30, 19, 9, 11, 17, 26, 21, 18, 20, 28, 16
Time on Bus
Number of Students
Number of Minutes
0–9, 10–19, 20–29, 30–39
1. Use 10-minute intervals starting at 0. List the intervals.
2. Make a frequency table of the data.
Check students' frequency tables.
3. Complete the histogram of the data.
Check students' histograms.
For 4–6, use the data below to make a histogram.
The heights, in inches, of the saplings in the nursery are shown below.
60, 48, 52, 64, 56, 59, 63, 58, 62, 65, 50, 57, 49, 60, 61, 67, 55, 58, 62, 63, 59, 56, 64, 65, 54, 51, 62, 57, 58, 64
4. Use 10-inch intervals for the data. List the intervals.
Possible answer: 40–49, 50–59, 60–69
5. Make a frequency table of the data.
Check students' frequency tables.
6. Make a histogram of the data.
Check students' histograms.
Problem Solving Real World
7. Use a smaller interval for the heights in Exercises 4–6. List the intervals.
Possible answer: 45–49, 50–54, 55–59, 60–64, 65–69
8. How does the histogram change?
Possible answer: The tallest bar is shorter than the tallest bar in the original histogram. There are more bars. Each interval includes a smaller number of heights.

GRP19

GR: Reteach, p. GRR19


Name _____ Lesson 19 Reteach
Histograms
A **histogram** is a graph that uses bars to show the number of data values that occur within equal intervals. The table below shows the test scores of the students in Omar's science class.
Science Test Scores
62 76 92 65 84 80 98 81 89 90 94 78 91 100 74 90 75 95 68 75 83 92 85 85 83 94
Use the data to make a histogram.
Step 1 Make a frequency table, using intervals of 10, and then start a bar graph. Write the intervals on the horizontal axis of the graph and label the axis.
Step 2 Choose a scale for the vertical axis that works with the frequencies. Use a scale from 0 to 12 with intervals of two. Label the axis.
Step 3 Draw a bar for each interval. The bar's height is determined by the frequency.
Step 4 Give the histogram a title.
Science Test Scores
Number of Students
Scores
61–70 71–80 81–90 91–100
For 1–2, use the data below.
The ages of the children in a swim club are given below.
6, 8, 11, 10, 7, 9, 8, 8, 7, 7, 12, 8, 8, 10, 10, 11, 12, 10, 9, 13, 14, 10, 11
1. Complete the frequency table. Use 3 years for each interval.
2. Complete the histogram.
Swim Club Ages
Number of Children
Ages
6–8 9–11 12–14
Reteach

GRR19
Grade 5

*GR – Getting Ready Lessons and Resources (*www.thinkcentral.com*)

Share and Show

For 1–3, use the data below.
The number of vacation days that each employee of a company took last summer is given below.

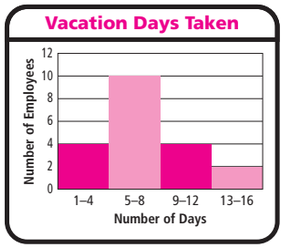
2, 5, 6, 11, 3, 5, 7, 8, 10, 1, 4, 6, 10, 5, 12, 15, 6, 8, 7, 14

1. Start at 1 day and use 4 days for each interval. List the intervals.
1–4, 5–8, 9–12, 13–16

2. Complete the frequency table.

Number of Days	Tally	Frequency
1–4	𝍸	4
5–8	𝍸 𝍸	10
9–12	𝍸	4
13–16	||	2

3. Complete the histogram.



On Your Own

For 4–6, use the data below.
The number of minutes that each student in Mrs. Green's class spent on homework last night is given below.

45, 30, 55, 35, 50, 48, 60, 38, 47, 56, 40, 39, 55, 65, 49, 34, 35

4. Start at 30 and use 10-minute intervals for the data. List the intervals.
30–39, 40–49, 50–59, 60–69

5. Make a frequency table of the data. **Check students' frequency tables.**

6. Make a histogram of the data. **Check students' histograms.**

Problem Solving

7. The number of words per minute that one class of students typed is given below.

30, 45, 28, 35, 48, 37, 41, 44, 34, 29, 25, 32, 40, 45, 39, 49

What are reasonable intervals for the data? **Possible answer: 25–29, 30–34, 35–39, 40–44, 45–49**

2 PRACTICE

Share and Show • Guided Practice

Point out to students that the range of the data for Exercises 1–3 is much less than the range of data on the previous page. Therefore, a smaller interval is being used on the horizontal axis. For Exercise 3, remind students to draw the bars for each interval and to give a title for the histogram.

On Your Own • Independent Practice

For Exercise 4, some students may forget to start with 30 when listing the 10-minute intervals. Use this opportunity to have students discuss the similarities and differences between using the different intervals.

Problem Solving Math Processes and Practices

For Exercise 7, be sure that students use reasonable intervals.

3 SUMMARIZE

Math Processes and Practices

Essential Question

How can you use a histogram to organize data? Possible answer: Make a frequency table with reasonable intervals for the data. Choose an appropriate scale and interval for the vertical axis and list the intervals on the horizontal axis. Label each axis. Then draw a bar for each interval. Give the histogram a title.

Math Journal WRITE Math

A store had 40 customers one day. The owner recorded the amount that each customer spent. Explain whether it is more appropriate to use a histogram or a bar graph to display the data.

LESSON 20

Analyze Histograms

LESSON AT A GLANCE

Lesson Objective
Analyze data in a histogram.

Materials
MathBoard

GO DIGITAL Animated Math Models

1 TEACH and TALK

GO DIGITAL • Animated Math Models

Unlock the Problem

Math Processes and Practices

Have students look at the histogram.

- **Can you tell the price that each item at the garage sale sold for? Why or why not?** No. The histogram shows only the number of items sold in each price interval, not the price of each item.
- **How can you read the value of a bar that falls halfway between two numbers on the vertical scale?** Possible answer: The value will be the number that falls in the middle or the median of the interval.
- **How can you tell how many items were sold at the garage sale?** I can find the sum of the frequencies for all of the intervals; 31 items.
- **Using the histogram, how can you calculate the least possible amount of money made during the garage sale?** Possible answer: I can find the product of the frequency and the lowest price in the range for each of the intervals and then find the sum of those products; $266.

Use Math Talk to check students' understanding of analyzing data in a histogram.

This lesson builds on graphing data presented in Chapter 9 and prepares students for analyzing histograms taught in Grade 6.

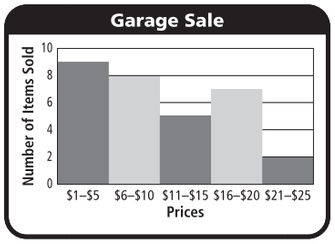
Name _____

Analyze Histograms

Essential Question How can you analyze data in a histogram?

Unlock the Problem Real World

The histogram shows the number of items sold at a garage sale within each price range.



ERROR Alert
Remember to read the intervals. For some questions, you may need to combine data from two or more intervals in order to answer the question.

How many of the items sold cost $6 to $10?

- Find the interval labeled $6–$10.
- Find the frequency.
- The bar for $6–$10 shows that 8 items were sold.

So, 8 of the items sold cost $6 to $10.

How many of the items sold cost $16 to $25?

- Find the frequencies for the intervals labeled $16–$20 and $21–$25.
- The bar for $16–$20 shows that 7 items were sold. The bar for $21–$25 shows that 2 items were sold.
- Add the frequencies.

7 + 2 + 9

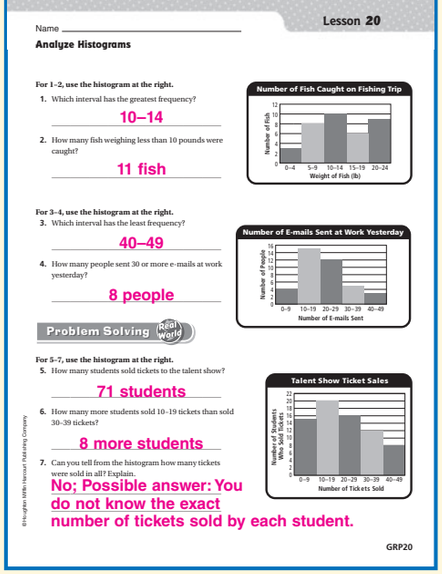
So, 9 of the items sold cost $16 to $25.

Math Talk **Mathematical Practices**

Explain why you cannot tell from the histogram the total amount of money that was made during the garage sale.

Possible explanation: You do not know how many of each item sold at a certain price.

GR: Practice, p. GRP20


Name _____ Lesson 20

Analyze Histograms

For 1–2, use the histogram at the right.

1. Which interval has the greatest frequency? 10–14
2. How many fish weighing less than 10 pounds were caught? 11 fish

Number of Fish Caught on Fishing Trip

For 3–4, use the histogram at the right.

3. Which interval has the least frequency? 40–49
4. How many people sent 30 or more e-mails at work yesterday? 8 people

Number of E-mails Sent at Work Yesterday

Problem Solving Real World

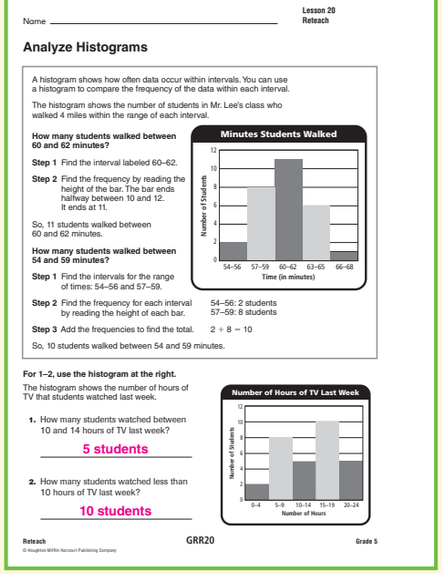
For 5–7, use the histogram at the right.

5. How many students sold tickets to the talent show? 71 students
6. How many more students sold 10–19 tickets than sold 30–39 tickets? 8 more students
7. Can you tell from the histogram how many tickets were sold in all? Explain. No; Possible answer: You do not know the exact number of tickets sold by each student.

Talent Show Ticket Sales

GRP20

GR: Reteach, p. GRR20


Name _____ Lesson 20 Reteach

Analyze Histograms

A histogram shows how often data occur within intervals. You can use a histogram to compare the frequency of the data within each interval.

The histogram shows the number of students in Mr. Lee's class who walked 4 miles within the range of each interval.

How many students walked between 60 and 62 minutes?

Step 1 Find the interval labeled 60–62.

Step 2 Find the frequency by reading the height of the bar. The bar ends halfway between 10 and 12. It ends at 11.

So, 11 students walked between 60 and 62 minutes.

How many students walked between 54 and 59 minutes?

Step 1 Find the intervals for the range of times: 54–56 and 57–59.

Step 2 Find the frequency for each interval by reading the height of each bar. 54–56: 2 students; 57–59: 8 students

Step 3 Add the frequencies to find the total. 2 + 8 = 10

So, 10 students walked between 54 and 59 minutes.

Minutes Students Walked

For 1–2, use the histogram at the right.

The histogram shows the number of hours of TV that students watched last week.

1. How many students watched between 10 and 14 hours of TV last week? 5 students
2. How many students watched less than 10 hours of TV last week? 10 students

Number of Hours of TV Last Week

Reteach GRR20 Grade 5

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Share and Show

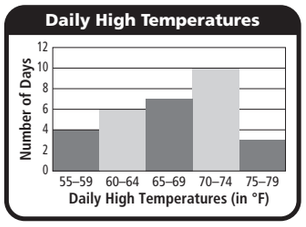
MATH BOARD

For 1–3, use the histogram at the right.

1. The histogram shows the number of days in one month whose temperatures were within each temperature range. On how many days was the temperature at or above 70°F?

   - List the bars that represent temperatures at or above 70°F.
     70–74 and **75–79**
   - The frequency for interval 70–74 is **10**, and the frequency for interval 75–79 is **3**.
   - Add the frequencies. **10** + **3** + **13**

   The daily high temperature was at or above 70°F on **13** days.



2. On how many days was the temperature 65°F to 69°F?
   7 days

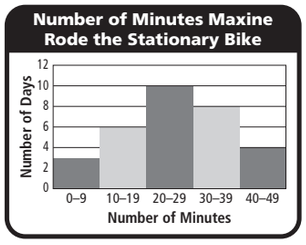
3. On how many days was the temperature less than 65°F?
   10 days

On Your Own

For 4–5, use the histogram at the right.

4. Which interval has the greatest frequency? **20–29**

5. How many days did Maxine ride the stationary bike for 30 or more minutes? **12 days**



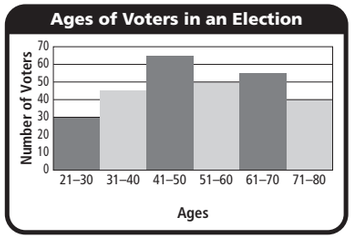
Problem Solving

Real World

For 6–7, use the histogram at the right.

6. How many people voted in the election?
   285 people

7. How many more voters were there from ages 41–50 than from ages 21–30?
   35 more voters



Getting Ready Lessons and Resources, pp. GR47–GR48

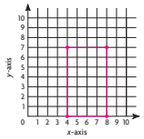
Checkpoint

Name _____

Checkpoint

Concepts and Skills

1. Plot and identify the polygon with vertices at (4, 0), (8, 7), (4, 7), and (8, 0).
   rectangle



2. A parallelogram has a base of 8.5 cm and a height of 6 cm. What is the area of the parallelogram?
   51 sq cm

3. Find the median and mode of Erin's math sores: 93, 88, 85, 93, 100, 95, 85, 89.
   median **91** mode **85 and 93**

4. Find the average of the following temperatures: 59°F, 66°F, 59°F, 67°F, 54°F, 64°F, 72°F.
   average **63°F**

For 5–7, use the data below.

The math test scores for Miss Jackson's class are given below.

88, 94, 86, 78, 65, 83, 71, 74, 92, 73, 95, 71, 100, 98, 68, 85, 81, 93, 89, 84

5. Make a histogram for the data using intervals of 10.
   Check students' graphs.

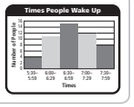
6. Which interval has the greatest frequency?
   Possible interval: 81–90

7. How many students received grades greater than 80? **13**

Problem Solving

Real World

For 8–9, use the histogram. The histogram shows the times that people wake up in the morning.



8. How many people were surveyed? **50 people**

9. How many more people surveyed wake up between 6:30 and 6:59 than between 7:30 and 7:59?
   7 more people

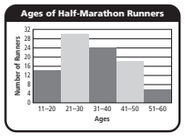
Fill in the bubble completely to show your answer.

10. On a map of the town of Barton, City Hall Park has three of its four vertices at (15, 0), (5, 0), and (15, 9). City Hall Park is a rectangle. What are the coordinates of the park's fourth vertex?
    - (A) (5, 9)
    - (B) (9, 5)
    - (C) (5, 15)
    - (D) (9, 15)

11. A window at an art gallery is shaped like a parallelogram. The base measures 1.2 meters and the height measures 0.8 meters. What is the area of the window?
    - (A) 0.48 sq m
    - (B) 0.96 sq m
    - (C) 1.92 sq m
    - (D) 2.0 sq m

12. The ages of the members of the Chess Club are given below. What is the median age?
    13, 9, 10, 9, 14, 13, 8, 9
    - (A) 9
    - (B) 9.5
    - (C) 10
    - (D) 10.5

13. The histogram shows the ages of runners in a half-marathon. How many runners are between the ages of 21 and 40?
    - (A) 24
    - (B) 30
    - (C) 42
    - (D) 54



2 PRACTICE

MATH BOARD

Share and Show • Guided Practice

Remind students to read the questions carefully as it may be necessary for them to combine the data for two intervals in order to solve the problems.

On Your Own • Independent Practice

For Exercise 5, have students read the question carefully to determine which interval or intervals are needed to solve the problem.

Problem Solving Math Processes and Practices

For Exercises 6 and 7, make sure students understand how to find the amount represented by a bar that is halfway between two numbers on the vertical scale.

3 SUMMARIZE

Math Processes and Practices

Essential Question

How can you analyze data in a histogram?

Possible answer: I can find the frequency for each interval and use the frequencies to answer questions about the data.

Math Journal WRITE Math

Write and answer a question using the histogram shown for Exercises 6 and 7.

Getting Ready for Grade 6 Test

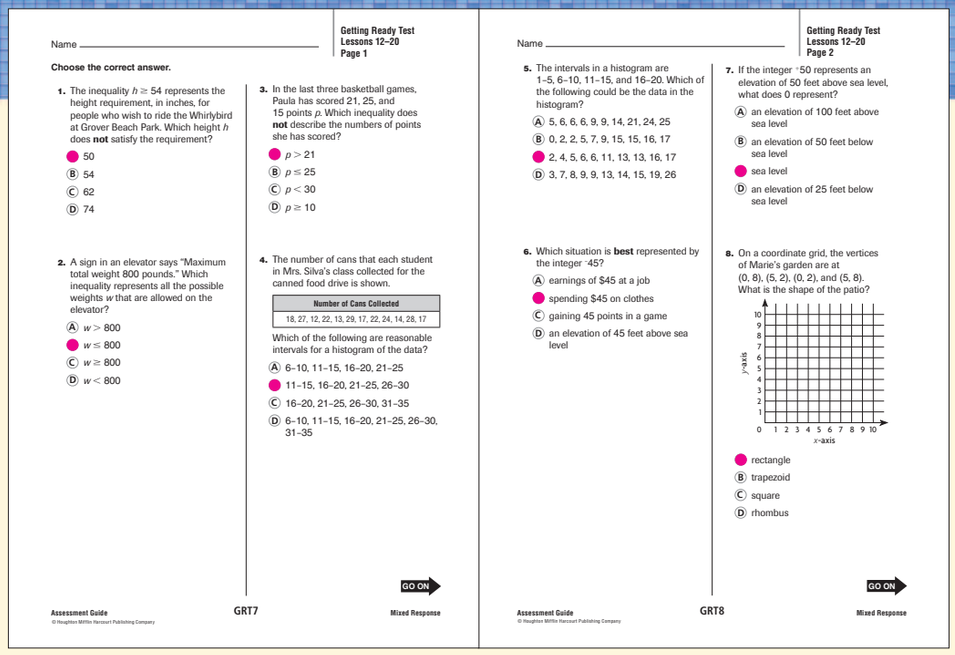
LESSONS 12 TO 20

Summative Assessment

Use the **Getting Ready Test** to assess students' progress in Getting Ready for Grade 6 Lessons 12–20.

Getting Ready Tests are provided in multiple-choice and mixed-response format in the *Getting Ready Lessons and Resources*.

GO DIGITAL Getting Ready Test is available online.



Name _____ Getting Ready Test Lessons 12–20 Page 1

Choose the correct answer.

1. The inequality $h \geq 54$ represents the height requirement, in inches, for people who wish to ride the Whirlybird at Grover Beach Park. Which height h does **not** satisfy the requirement?
- ● 50
- Ⓑ 54
- Ⓒ 62
- Ⓓ 74

2. A sign in an elevator says "Maximum total weight 800 pounds." Which inequality represents all the possible weights w that are allowed on the elevator?
- Ⓐ $w > 800$
- ● $w \leq 800$
- Ⓒ $w \geq 800$
- Ⓓ $w < 800$

3. In the last three basketball games, Paula has scored 21, 25, and 15 points p. Which inequality does **not** describe the numbers of points she has scored?
- ● $p > 21$
- Ⓑ $p \leq 25$
- Ⓒ $p < 30$
- Ⓓ $p \geq 10$

4. The number of cans that each student in Mrs. Silva's class collected for the canned food drive is shown.

Number of Cans Collected
18, 27, 12, 22, 13, 29, 17, 22, 24, 14, 28, 17

Which of the following are reasonable intervals for a histogram of the data?
- Ⓐ 6–10, 11–15, 16–20, 21–25
- ● 11–15, 16–20, 21–25, 26–30
- Ⓒ 16–20, 21–25, 26–30, 31–35
- Ⓓ 6–10, 11–15, 16–20, 21–25, 26–30, 31–35

GO ON

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Name _____ Getting Ready Test Lessons 12–20 Page 2

5. The intervals in a histogram are 1–5, 6–10, 11–15, and 16–20. Which of the following could be the data in the histogram?
- Ⓐ 5, 6, 6, 6, 9, 9, 14, 21, 24, 25
- Ⓑ 0, 2, 2, 5, 7, 9, 15, 15, 16, 17
- ● 2, 4, 5, 6, 6, 11, 13, 13, 16, 17
- Ⓓ 3, 7, 8, 9, 9, 13, 14, 15, 19, 26

6. Which situation is **best** represented by the integer -45?
- Ⓐ earnings of $45 at a job
- ● spending $45 on clothes
- Ⓒ gaining 45 points in a game
- Ⓓ an elevation of 45 feet above sea level

7. If the integer -50 represents an elevation of 50 feet above sea level, what does 0 represent?
- Ⓐ an elevation of 100 feet above sea level
- Ⓑ an elevation of 50 feet below sea level
- ● sea level
- Ⓓ an elevation of 25 feet below sea level

8. On a coordinate grid, the vertices of Marie's garden are at (0, 8), (5, 2), (0, 2), and (5, 8). What is the shape of the patio?

- ● rectangle
- Ⓑ trapezoid
- Ⓒ square
- Ⓓ rhombus

GO ON

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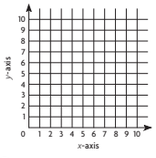
Name _____ Getting Ready Test Lessons 12–20 Page 3

9. A parallelogram is drawn on a coordinate grid. Three of the coordinates are (3, 6), (5, 3), and (7, 5). Which could **not** be the coordinates of the fourth vertex?



- Ⓐ (1, 4)
- ● (6, 1)
- Ⓒ (5, 8)
- Ⓓ (9, 2)

10. A traffic sign is drawn on a coordinate grid. The vertices of the sign are (2, 2), (5, 8), (0, 5), (5, 2), (2, 8), and (7, 5). What is the shape of the sign?
- Ⓐ rectangle
- Ⓑ pentagon
- ● hexagon
- Ⓓ octagon

11. The prices of 8 sweaters, in dollars, are given.

Sweater Prices (dollars)
30, 41, 36, 31, 28, 43, 28, 35

What is the median of the data?
- Ⓐ $28
- ● $33
- Ⓒ $34
- Ⓓ $35

12. The number of bird species seen by seven birdwatchers is given.

Number of Bird Species
29, 27, 36, 40, 36, 27, 35

What is the mode of the data?
- ● 27 and 36
- Ⓑ 27
- Ⓒ 36
- Ⓓ no mode

GO ON

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Name _____ Getting Ready Test Lessons 12–20 Page 4

Write the correct answer.

13. Greg wants to find the median of a set of 9 data items. First, he ordered the items from least to greatest. What should he do next?

Possible answer: Find the middle item.

14. The basketball team practiced for h hours. The baseball team practiced for 3 more hours than the basketball team. Write an expression that represents the number of hours that the baseball team practiced.

$h + 3$

15. The expression $w \times 7$ gives the number of days in w weeks. What is the value of the expression when $w = 14$?

98

16. There are 3 feet f in a yard. Write an expression that represents the number of yards that are equivalent to f feet.

$f \div 3$

GO ON

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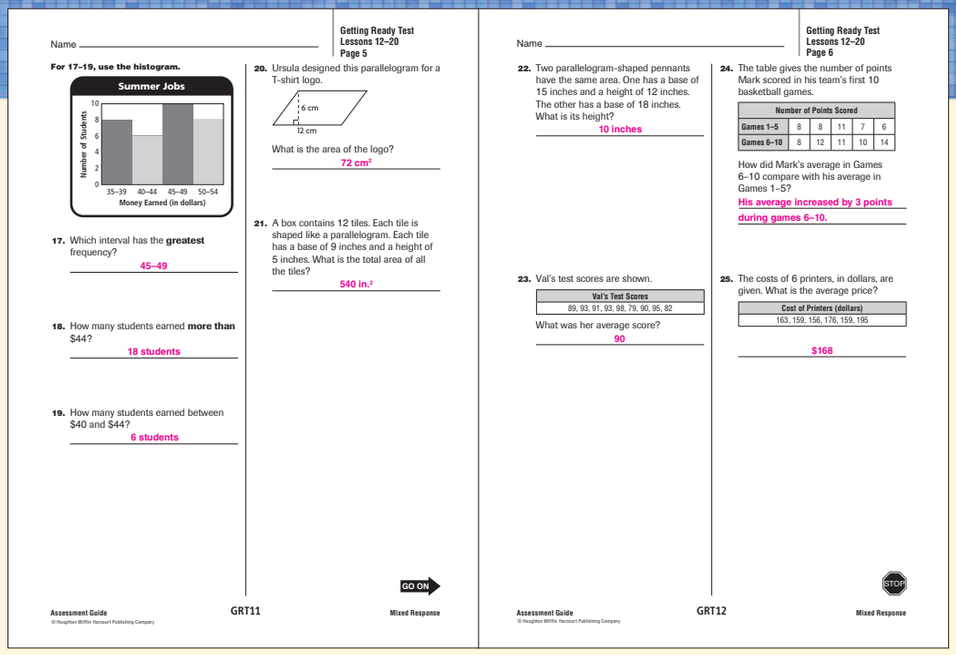
Data-Driven Decision Making RtI

Item	Lesson	Common Error	Intervene With
1, 2, 3	14	May not understand the meaning of inequalities and how to use inequalities to solve problems	R—GRR14
4, 5	19	May not understand how to organize data using a histogram	R—GRR19
6, 7	12	May not understand how to use positive and negative numbers to represent real-world quantities	R—GRR12
8, 9, 10	15	May not understand how to plot and interpret polygons on a coordinate grid	R—GRR15
11, 12, 13	17	May not understand how to find the median and mode of a data set	R—GRR17

Key: R—Getting Ready Lessons and Resources: Reteach



Name _____ Getting Ready Test Lessons 12–20 Page 5

For 17–19, use the histogram.

17. Which interval has the **greatest** frequency?

45–49

18. How many students earned **more than** $44?

18 students

19. How many students earned between $40 and $44?

6 students

20. Ursula designed this parallelogram for a T-shirt logo.

What is the area of the logo?

72 cm²

21. A box contains 12 tiles. Each tile is shaped like a parallelogram. Each tile has a base of 9 inches and a height of 5 inches. What is the total area of all the tiles?

540 in.²

GO ON

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Name _____ Getting Ready Test Lessons 12–20 Page 6

22. Two parallelogram-shaped pennants have the same area. One has a base of 15 inches and a height of 12 inches. The other has a base of 18 inches. What is its height?

10 inches

23. Val's test scores are shown.

Val's Test Scores
89, 93, 91, 93, 98, 79, 90, 95, 82

What was her average score?

90

24. The table gives the number of points Mark scored in his team's first 10 basketball games.

Number of Points Scored					
Games 1–5	8	8	11	7	6
Games 6–10	8	12	11	10	14

How did Mark's average in Games 6–10 compare with his average in Games 1–5?

His average increased by 3 points during games 6–10.

25. The costs of 6 printers, in dollars, are given. What is the average price?

Cost of Printers (dollars)
163, 159, 156, 176, 159, 195

$168

STOP

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Portfolio Suggestions The portfolio represents the growth, talents, achievements, and reflections of the mathematics learner. Students might spend a short time selecting work samples for their portfolios.

You may want to have students respond to the following questions:

- What new understanding of math have I developed in the past several weeks?
- What growth in understanding or skills can I see in my work?
- What can I do to improve my understanding of math ideas?
- What would I like to learn more about?

For information about how to organize, share, and evaluate portfolios, see the *Chapter Resources.*

Data-Driven Decision Making RtI

Item	Lesson	Common Error	Intervene With
14, 15, 16	13	May not understand how to write, interpret, and evaluate expressions	**R**—GRR13
17, 18, 19	20	May not understand how to analyze and interpret data presented in a histogram	**R**—GRR20
20, 21, 22	16	May not understand how to find the area of a parallelogram, given its base and height	**R**—GRR16
23, 24, 25	18	May not understand how to find the average of a data set	**R**—GRR18

Key: R—Getting Ready Lessons and Resources: Reteach