Name: _____

Prerequisite: How do you show division using fractions?

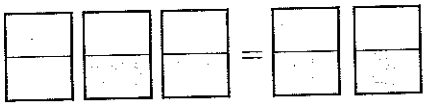
Study the example problem showing how to write a division problem as a fraction. Then solve problems 1–7.

Example

There are 3 bags of popcorn to divide equally among 2 students. How much popcorn will each student get?

There are 3 bags of popcorn for 2 students to share, which is $3 \div 2$.

Divide each of the 3 bags into 2 equal parts. Each student will get $\frac{1}{2}$ of each bag.



$\frac{1}{2} \times 3 = \frac{3}{2}$

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

Each student will get $\frac{3}{2}$ bags of popcorn.

1. How many whole bags plus how many one-half bags of popcorn would each student get?

_____ whole bag(s) _____ one-half bag(s)

2. How can you combine your answers in problem 1 to write how many bags of popcorn each student will get as a mixed number?

_____

3. Nine yards of ribbon are cut into 8 equal pieces. What is the length of each piece of ribbon? Write a division expression to represent the problem and solve.

_____

Solve.

4 How could you model 5 students sharing 4 bags of popcorn equally? How much will each student get?

5 In a store, 60 cans of soup are arranged to be displayed in 10 equal rows. Why does the fraction $\frac{10}{60}$ not represent this situation? Explain.

6 Emilio bakes 2 pies. He shares them equally among 3 friends. How much pie does each person get? Express your answer as a fraction.

Show your work.

Solution: _____

7 Isabel is making lemonade for a party with 12 guests. She wants to make equal servings that are least 2 cups each. She makes 7 quarts of lemonade. Does she have enough lemonade for each guest? (1 quart = 4 cups)

Show your work.

Solution: _____

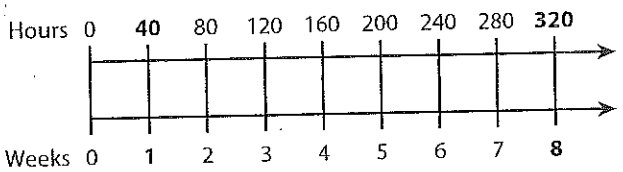
Lesson 2

Name: _____

Study the example showing how a double number line is used to find rate and unit rates. Then solve problems 1–6.

Example

The double number line below shows the relationship between the numbers of hours and weeks Linda works. Linda worked 320 hours in 8 weeks.



The ratio of hours to weeks is 320 to 8.

The rate is 40 hours to 1 week. The unit rate is 40.

1. Choose a corresponding pair of numbers from the top and bottom number lines. Write a multiplication equation to show how the number of weeks and hours are related.

_____

2. Use words to describe the relationship between corresponding numbers of hours and weeks.

_____

_____

_____

3. Explain how you can use the answer to problem 2 to verify the unit rate is 40.

_____

_____

_____

_____

Vocabulary

ratio compares two quantities.

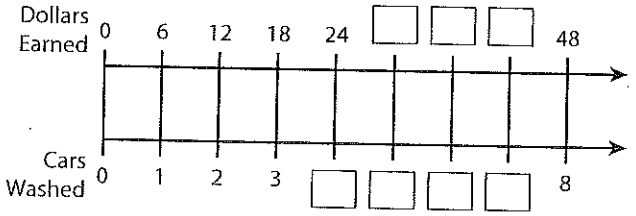
rate compares the first quantity in a ratio to only one of the second quantity.

unit rate the numerical part of the rate, without the units.

Solve.

Use the following situation to solve problems 4–5.

The double number line shows the relationship between dollars earned and cars washed at a school fundraiser. Students earned 48 dollars washing 8 cars. The ratio of dollars earned to cars washed is 48 : 8.



4 What pattern do you see in the dollars earned? Use the pattern to complete the top number line.

What pattern do you see in the number of cars washed? Use the pattern to complete the bottom number line.

Explain how the patterns show the rate of dollars earned to cars washed.

5 The unit rate comparing dollars earned to cars washed is 6. If the fundraiser earned $318, how many cars were washed? Explain.

6 There are 50 campers at day camp and 10 counselors. Write the ratio of campers to counselors as a fraction. Explain how to use equivalent fractions to write a related rate and unit rate. What does the unit rate tell you?

Name: _____

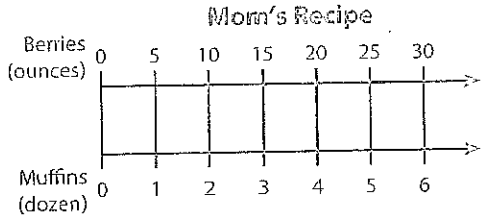
Study the example. Underline two parts that you think make it a particularly good answer and a helpful example.

Example

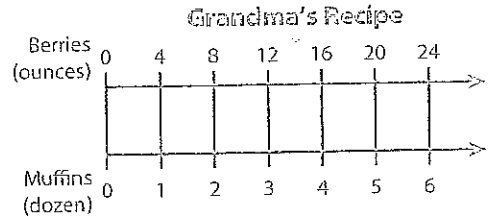
Mom's muffin recipe uses 10 ounces of berries for 2 dozen muffins. Grandma's muffin recipe uses 12 ounces of berries for 3 dozen muffins. Which recipe has more berries per dozen muffins? How many ounces of berries would you need to make 60 muffins of this recipe? (1 dozen = 12 muffins)

Show your work. Use ratios, unit rates, models, and words to explain your thinking.

In Mom's recipe, the ratio of berries (ounces) to muffins (dozens) is 10 : 2. There are 5 ounces of berries per 1 dozen muffins. So the unit rate is 5.



In Grandma's recipe, the ratio of berries (ounces) to muffins (dozens) is 12 : 3. There are 4 ounces of berries per 1 dozen muffins. So the unit rate is 4.

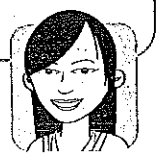


The unit rate of 5 is greater than the unit rate of 4, so Mom's recipe has more berries per dozen.

60 muffins = 5 dozen muffins, so I would need 5 × 5 or 25 ounces of berries for 5 dozen muffins of Mom's recipe.

Where does the example . . .

- answer both parts of the problem?
- use words to explain?
- use numbers to explain?
- use models to explain?
- give details?



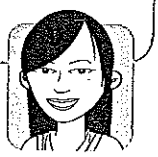
Solve the problem. Use what you learned from the model.

You buy 3 tickets for $48 total for the jazz concert on Friday night. Your friend buys 2 tickets for $36 total for the jazz concert on Saturday night. Your brother collected $96 from his friends to buy 6 tickets. Which night can they go to the concert? Did they buy the less expensive tickets? Explain.

Show your work. Use ratios, unit rates, models, and words to explain your thinking.

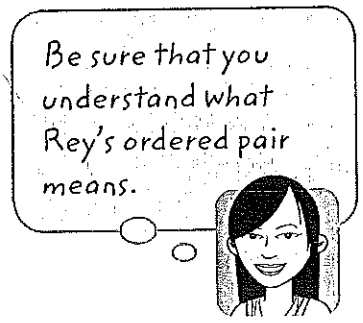
Where does the example . . .

- answer both parts of the problem?
- use words to explain?
- use numbers to explain?
- use models to explain?
- give details?



Solve.

3 Rey buys 4 cards for $10. He plots the point (4, 10) on a graph. All cards are the same price. He wants to see how much it would cost to buy more cards. Tell whether each statement is *True* or *False*.



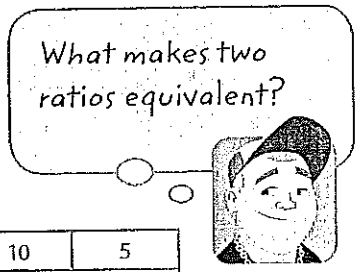
a. The point (6, 15) will be on the graph. ☐ True ☐ False

b. Rey buys 1 card for $3.50. ☐ True ☐ False

c. Rey buys 100 cards for less than $40. ☐ True ☐ False

d. The point (14, 35) will be on the graph. ☐ True ☐ False

4 Each table shows four ratios of boys to girls at different sporting events. Which tables show four equivalent ratios of boys to girls? Select all that apply.



A

3	5	9	12
5	7	15	20

B

3	4	7	11
12	16	28	44

C

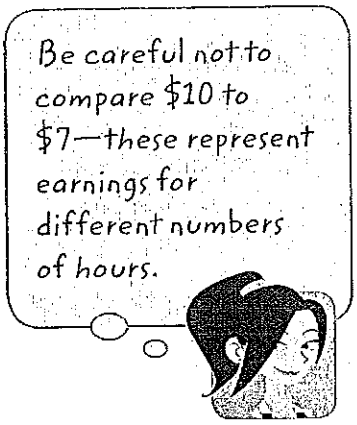
45	25	10	5
18	10	4	2

D

200	150	100	50
50	40	30	20

5 Rosa earns $10 for every 3 hours that she works. Ralph earns $7 for every 2 hours that he works. Who earns more per hour? How much *more* does this person earn after 12 hours of work?

Show your work.



Solution: _____

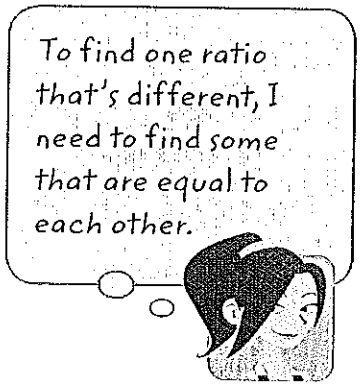
_____

Name: _____

Equivalent Ratios

Solve the problems.

1 Kate, Mario, Sato, and Den each use a different recipe to make trail mix. Which recipe uses a different ratio of cups of raisins to cereal than the rest?



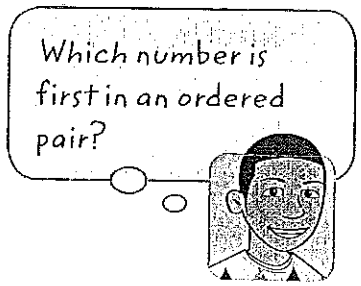
A Kate uses 3 cups of raisins for every 8 cups of cereal.

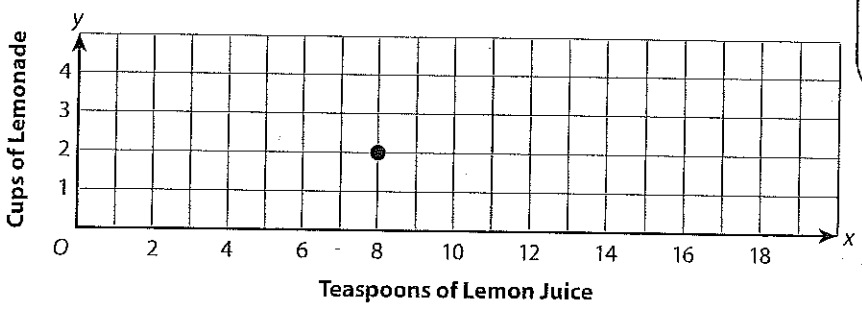
B Mario uses 4 cups of raisins for every 12 cups of cereal.

C Sato uses 6 cups of raisins for every 16 cups of cereal.

D Den uses 9 cups of raisins for every 24 cups of cereal.

2 The graph shows the number of teaspoons of lemon juice in cups of lemonade.





Which ordered pair represents a ratio equivalent to the ratio of teaspoons of lemon juice to cups of lemonade shown by the point on the graph?

A (4, 16)

B (6, 1)

C (9, 3)

D (16, 4)

Oscar chose **A** as the correct answer. How did he get that answer?

_____

_____

Solve.

Use the following situation for problems 5–8.

To make a scarf, Jenny uses blue yarn and white yarn. The number of yards of blue yarn she uses is 4 times the number of yards of white yarn in each scarf.

5 Write four ratios to show the number of yards of white yarn to blue yarn for each scarf.

6 Are the ratios in problem 5 equivalent? Explain how you know.

_____

_____

7 Jenny wants to make a scarf that uses 24 yards of blue yarn. How many yards of white yarn will she need?

_____

8 If Jenny wants to keep the ratio of blue yarn to white yarn the same, can she make a scarf using 42 yards of blue yarn? If so, how much white yarn will she need? If not, why not?

_____

_____

_____

9 Adrianna can read 7 pages in 10 minutes. At this rate, how many pages can she read in 25 minutes?

_____

10 Max calculated that he could read at a rate of 2 pages per minute. Is he reading at a faster rate than Adrianna? Explain.

_____

_____

_____

_____

Name: _____

Graph Equivalent Ratios

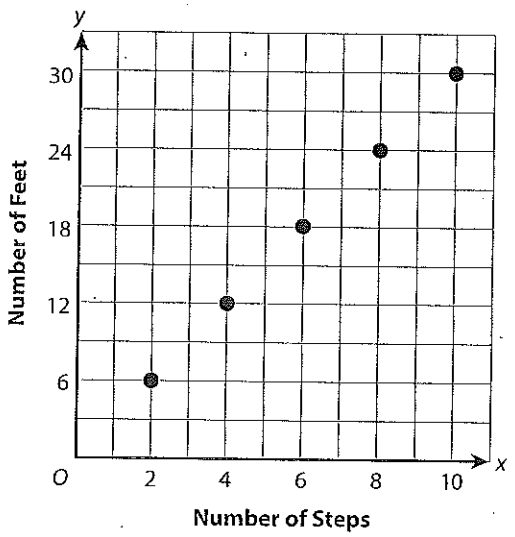
Study the example problem showing how to graph equivalent ratios. Then solve problems 1–10.

Example

The graph compares how far Jorge walks to how many steps he takes. How many feet does he walk in 6 steps? How many steps does Jorge take to walk 30 feet?

Each point on the graph can be represented by an ordered pair. The point represented by (6, 18) shows that Jorge takes 6 steps to walk 18 feet.

The ordered pair for 30 feet is (10, 30), which means that Jorge walks 30 feet in 10 steps.



1. What ordered pair represents the number of steps Jorge takes to walk 24 feet?

_____

2. Choose another point on the graph. Write the ordered pair and tell what it represents.

_____

3. What ordered pair represents the number of feet Jorge walks in 3 steps?

_____

4. Joan looks at the graph and says the number of steps is always 3 times the number of feet. Is she correct? Explain your answer.

_____

_____

Solve.

Use the following information to solve problems 5–7.

The list below shows how many servings of different breakfast items that a restaurant expects to sell every 15 minutes:

Cups of coffee	25
Glasses of orange juice	10
Omelets	6

5 How many glasses of orange juice does the restaurant expect to sell in 1 hour?

Show your work.

Solution: _____

6 At this rate, how long will it take to sell 200 cups of coffee?

Show your work.

Solution: _____

7 The restaurant serves breakfast from 6:00 AM until 10:30 AM. They sell 6 omelets every 15 minutes. Should the restaurant expect to sell more than or fewer than 100 omelets? Explain your answer.

_____

_____

_____

_____

_____

Name: _____

Study the example problem showing how to find equivalent ratios. Then solve problems 1–7.

Example

Elena uses 12 red beads to make 4 bracelets. How many red beads will Elena need to make 12 bracelets? How many red beads will Elena need to make 20 bracelets?

You can make a table showing the number of bracelets that can be made with different numbers of red beads. The pairs of numbers in each column show the ratio of red beads to bracelets. Notice the ratios are all equivalent.

Number of Red Beads	3	6	12	24	36	48	60	72
Number of Bracelets	1	2	4	8	12	16	20	24

The table shows Elena will need 36 red beads to make 12 bracelets. Elena will need 60 red beads to make 20 bracelets.

1. How many red beads will Elena need to make 16 bracelets?

_____

2. How many bracelets can Elena make with 24 red beads?

_____

3. Find the rate of red beads per bracelet. Explain how you found your answer.

_____

_____

4. James said that he would need 25 red beads to make 75 bracelets. Is he correct? How did he get that answer?

_____

_____

_____

Solve.

4 In Ellen's sixth-grade class, there are 14 boys and 11 girls. Write each ratio using numbers in two ways.

Number of girls to number of boys

_____

Number of boys to total number of students

_____

Total number of students to number of girls

_____

Number of boys to number of girls

_____

5 For every 4 miles that Pedro runs, he walks 3 miles. Tell whether each statement is *True* or *False*.

a.	The ratio of miles walked to miles run is 4 : 3.	☐ True	☐ False
b.	The ratio of miles walked to total miles is 3 : 7.	☐ True	☐ False
c.	The ratio of miles run to total miles is 7 to 3.	☐ True	☐ False
d.	The ratio of total miles to miles run is $\frac{7}{4}$.	☐ True	☐ False
e.	The ratio of miles run to miles walked is 4 to 3.	☐ True	☐ False

6 For sixth-grade field day, 6 students in Alice's class are playing volleyball, 5 students are playing soccer, and 9 students are playing basketball. Alice said that the ratio of students playing volleyball to basketball was 6 : 9. Alex said that the ratio of students playing basketball to volleyball was $\frac{9}{6}$. Who is correct? Explain.

_____

_____

_____

_____

Name: _____

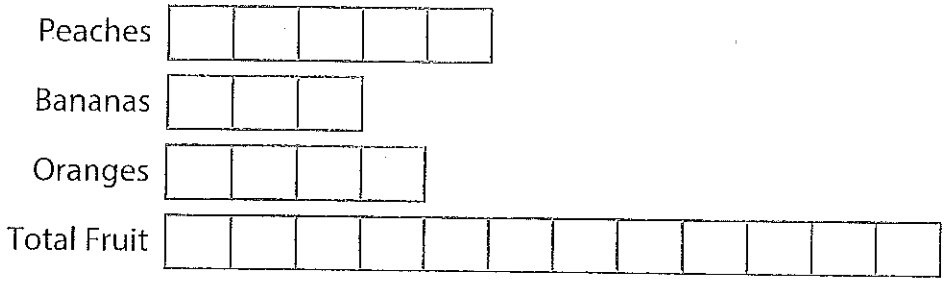
Prerequisite

Study the example problem showing how to use ratios to compare two quantities. Then solve problems 1–6.

Example

Noelle buys 5 peaches, 3 bananas, and 4 oranges at a local fruit stand to make fruit punch. What is the ratio of the number of bananas to the number of peaches she bought?

A tape diagram can help you compare the quantities.



There are 3 bananas and 5 peaches.

The ratio of bananas to peaches can be written as 3 to 5, 3 : 5, or $\frac{3}{5}$.

1. What is the ratio of peaches to oranges?

_____

2. What is the ratio of the number of bananas to the total number of pieces of fruit?

_____

3. Write a ratio in words to compare a whole to a part. Then write the ratio using numbers.

_____

_____

Vocabulary

ratio a comparison of two quantities.

Solve Problems with Unit Rate

Name: _____

Prerequisite: Equivalent Ratios

Study the example problem showing how to find equivalent ratios. Then solve problems 1–6.

Example

Ramon needs 12 oranges to make 3 glasses of juice. How many oranges does he need to make 5 glasses? How many oranges does he need to make 8 glasses?

You can make a table to show ratios of the number of oranges to the number of glasses of juice.

Number of oranges	4	8	12	16	20	24	28	32
Number of glasses	1	2	3	4	5	6	7	8

Ramon needs 20 oranges to make 5 glasses of juice.

Ramon needs 32 oranges to make 8 glasses of juice.

1. What ratio is given in the problem for the number of oranges to the number of glasses of juice?

_____

2. What is the unit rate? Explain what it means in this situation.

_____

_____

3. Explain how you can write equivalent ratios.

_____

_____

_____

_____

_____

_____

Vocabulary

equivalent ratios two or more ratios that are equal to one another.

24 : 2, 36 : 3, 48 : 4

Solve.

4 Nathan does push-ups for the same amount of time every day. He does 9 minutes of push-ups in 3 days. How many minutes of push-ups does Nathan do in 7 days? Make a table to show the relationship between the number of minutes and the number of days.

Show your work.

Solution: _____

5 Students are knitting scarves for a fund-raiser. Elaine can knit 4 scarves in 20 days. Mario can knit 2 more scarves than Elaine can in 40 days. What is the difference in the time it takes each of them to knit a scarf? Explain your answers.

Show your work.

Solution: _____

6 There are 24 total customers seated at 4 tables in a restaurant. Each table has the same number of customers. Tell whether each statement is *True* or *False*.

a. Multiply 24 by 4 to find the number of customers per table. ☐ True ☐ False

b. The unit rate for the number of customers per table is 6. ☐ True ☐ False

c. The ratio of customers to tables is 24 : 4. ☐ True ☐ False

d. If all the tables are the same size, a maximum of 30 customers can sit at 6 tables. ☐ True ☐ False

Name: _____

Study the example problem showing how to solve a problem about unit price. Then solve problems 1–7.

Example

All the comic books in a store are the same price. Vera buys 3 comic books for $7.50. How much do 5 comic books cost? How much do 8 comic books cost?

Divide 7.50 by 3 to find the unit price.

$7.50 \div 3 = 2.50$

The price per book is $2.50. You can use the unit price to make a table of equivalent ratios.

cost ($)	2.50	5.00	7.50	10.00	12.50	15.00	17.50	20.00
comic books	1	2	3	4	5	6	7	8

The cost of 5 comic books is $12.50.

The cost of 8 comic books is $20.00.

1. How can you use multiplication to find the cost of 5 comic books?

_____

2. How can you use addition to find the cost of 8 comic books?

_____

3. Explain how to find the number of comic books you could buy with $25.00.

_____

_____

_____

_____

Solve.

Use the following situation to solve problems 4–7.

All of the used hardcover books at a yard sale are the same price. Hugo paid $4.50 for 6 books.

4 Explain how to find the unit price of the books.

_____

5 Hugo's friends bought used books at the yard sale. Sonia paid $2.25, John paid $6.00, and Keisha paid $3.75. How many books did each friend buy?

Show your work.

Solution: _____

6 Kim bought 10 used books at the yard sale. How much did she pay? Did you use addition or multiplication to solve this problem? Why?

_____

7 The price for the used paperback books at the yard sale was $0.25 less than for the hardcover books. How many more paperback books than hardcover books could someone buy with $3.00?

Show your work.

Solution: _____

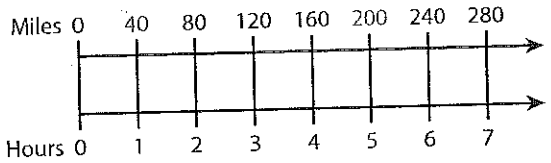
Name: _____

Study the example problem showing how to solve a problem about constant speed. Then solve problems 1–7.

Example

Kenja traveled 120 miles in 3 hours on a train. At this speed, how long will it take her to travel 200 miles?

The unit rate for miles per hour is 120 ÷ 3, or 40. Use the unit rate to make a double number line.



Divide 200 by 40.
200 ÷ 40 = 5

It will take Kenja 5 hours to travel 200 miles.

1. How many miles could Kenja travel in 1 hour. Is this the same number of hours it takes Kenja to travel 1 mile? Explain your answer.

2. Explain how to use the unit rate for miles per hour to find how many miles Kenja can travel in 8 hours.

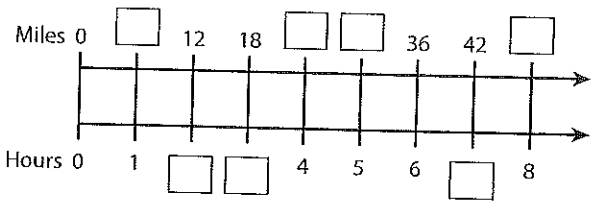
3. Explain how to use the double number line to find how many hours it will take Kenja to travel 220 miles.

Solve.

Use the following situation to solve problems 4–6.

Zachary exercises by jogging at a constant speed. During one week, he jogged 36 miles in 6 hours.

4 Complete the double number line to show the relationship between the number of miles and the hours that Zachary jogs.



5 Explain how you found the number of hours it takes Zachary to jog 18 miles.

_____

_____

6 How many miles does Zachary jog in 4.5 hours? Explain how to use the double number line to find the answer.

_____

_____

7 Alyssa and Caleb both drove 210 miles to the beach in separate cars. They left at the same time. They both drove at a constant speed. Alyssa drove 105 miles in 3.5 hours. Caleb drove 168 miles in 4 hours. Who arrived earlier? How much earlier?

Show your work.

Solution: _____

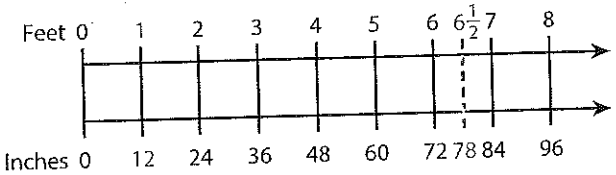
Name: _____

Study the example problem showing how to solve a problem involving conversion of measurement units. Then solve problems 1–6.

Example

Hannah needs 78 inches of ribbon to make a picture frame. She knows that there are 60 inches in 5 feet. How many feet of ribbon are in 78 inches?

You can find the unit rate and make a double number line. There are 60 inches in 5 feet, so there are $60 \div 5 =$ 12 inches in 1 foot. The unit rate is 12.



Because the number of inches, 78, is halfway between 72 and 84, the number of feet must be halfway between 6 and 7 feet. There are $6\frac{1}{2}$ feet of ribbon in 78 inches.

1. Explain how to use the unit rate without the number lines to find how many feet of ribbon are in 48 inches.

_____

2. How many inches of ribbon are in 3 feet? Explain how to find the answer without using the number lines.

_____

3. What is the difference between using the unit rate to find how many feet are in a given number of inches and using the unit rate to find how many inches are in a given number of feet?

_____

_____

_____

Solve.

Use the following situation to solve problems 4–5.

Antonio measures items in his pocket. He knows there are 50 millimeters in 5 centimeters. His key chain is 3.5 centimeters long. His library card is 80 millimeters long.

4 How many centimeters long is his library card? Explain how to use the unit rate to find the answer.

5 How many millimeters long is his key chain? Draw a double number line to find the answer.

Show your work.

Solution: _____

6 Claire is measuring ingredients for recipes. She knows that there are 12 cups in 6 pints. She also knows that 4 quarts equals 16 cups. Which has more cups, 5 pints or 3 quarts? How many more cups?

Show your work.

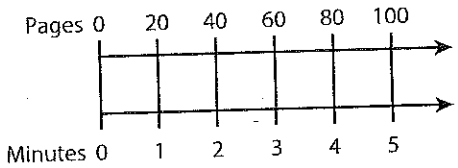
Solution: _____

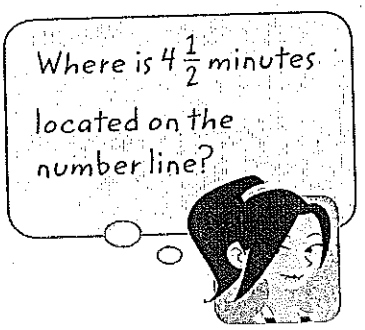
Name: _____

Solve Problems with Unit Rate

Solve the problems.

1 The double number line shows the relationship between the number of minutes and the number of pages that a printer prints. How many pages does the printer print in $4\frac{1}{2}$ minutes?

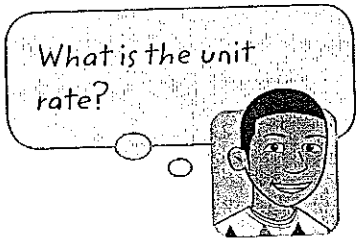




A 80 pages **B** 85 pages **C** 90 pages **D** 100 pages

2 A carpenter uses 65 shelves to make 13 bookcases. She uses the same number of shelves for each bookcase. Are 32 shelves enough to build 6 more bookcases?

Show your work.

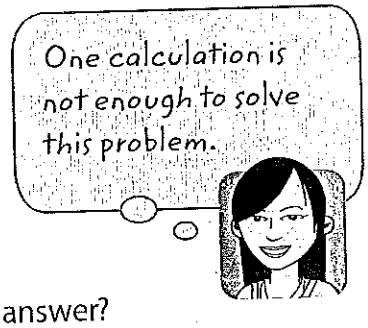


Solution: _____

3 The price of 6 pretzels is $5.10. Simon and Sofia bought 8 pretzels and shared the cost equally. How much did each person pay?

A $0.85 **C** $6.80

B $3.40 **D** $20.40



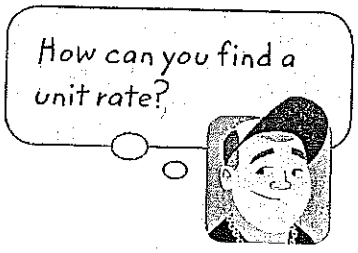
Jacob chose **C** as the correct answer. How did he get that answer?

_____

_____

Solve.

4 Michael drove 350 miles in 7 hours at a constant speed. Tell whether each statement is *True* or *False*.



a. The unit rate for miles to hours is 50. ☐ True ☐ False

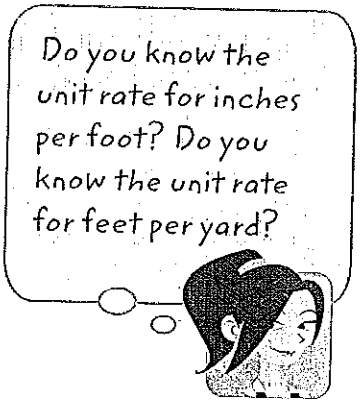
b. Michael drove 250 miles in 4 hours. ☐ True ☐ False

c. To find the number of miles Michael drove in 3 hours, multiply 3 by 50. ☐ True ☐ False

d. To find the number of hours it took Michael to drive 300 miles, divide 300 by 50. ☐ True ☐ False

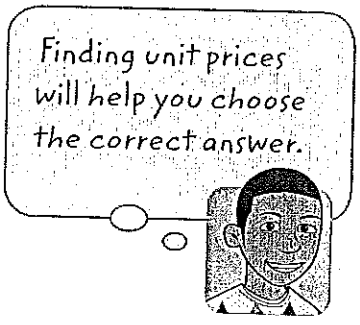
5 Jorge says there are 198 inches in 5.5 yards. Is he correct? Explain your answer.

Show your work.



Solution: _____

6 At Teen Tops, a package of 5 T-shirts costs $38. At Bargain City, a package of 4 T-shirts costs $34. Which statement is the most accurate?



A Bargain City is the better buy because it sells T-shirts at $8.50 per T-shirt.

B Teen Tops is the better buy because the package has more T-shirts.

C Bargain City is the better buy because $34 is less than $38.

D Teen Tops is the better buy because it sells T-shirts at $7.60 per T-shirt.

Lesson 4B

Convert Between Measurement Systems

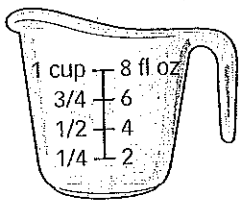
Name: _____

Prerequisite: Use Unit Rates

Study the example showing how to use a unit rate. Then solve problems 1–5.

Example

Estella needs 4 cups of vegetable broth to make soup. The vegetable broth container gives the amount of broth in fluid ounces.



Estella knows that 1 cup of liquid is equivalent to 8 fluid ounces. How many fluid ounces of broth does she need?

Rate: 8 fluid ounces per cup

Unit Rate: 8

You can multiply the number of cups by the unit rate to find the equivalent number of fluid ounces.

Cups	×	Unit rate	=	Fluid ounces
4	×	8	=	32

Estella needs 32 fluid ounces of broth to make soup.

1. How do you convert a given number of cups to find the equivalent number of fluid ounces?

_____

2. How can you convert a given number of fluid ounces to find the equivalent number of cups? Explain.

_____

_____

_____

_____

Vocabulary

unit rate the part of the rate that is being compared to 1.

Solve.

3 A leaf from a banana tree is 450 millimeters long, which is equivalent to 45 centimeters. A leaf from a birch tree is 80 millimeters long. Tell whether each statement is *True* or *False*.

a. The unit rate for millimeters per centimeter is 10. ☐ True ☐ False

b. The leaf from the birch tree is 800 centimeters long. ☐ True ☐ False

c. To find the length of a leaf in millimeters, multiply the length of the leaf in centimeters by 10. ☐ True ☐ False

4 Jared is a rock climber. He records his climb heights in yards and in feet. Complete the table showing Jared's climb heights using the fact that 1 yard = 3 feet.

Yards	15	20		
Feet			75	90

5 Janelle is filling two buckets with water. The blue bucket holds 5 quarts of water, and the red bucket holds 9 pints of water. Which bucket holds more water? How many cups more does it hold?

1 quart = 2 pints
1 pint = 2 cups

Show your work.

Solution: _____

_____

Lesson 4B

Name: _____

Convert Between Measurement Systems

Study the example showing how to convert meters to feet. Then solve problems 1–7.

Example

The running distances at a track meet are given in meters. Hallie knows that 1 meter is about 3.3 feet. Hallie runs the 60-meter event at the meet. About how far does she run in feet?

You can find the rate and unit rate for feet per meter.

Rate: 3.3 feet per meter
Unit Rate: 3.3

To convert meters to feet, multiply the number of meters by the unit rate of feet per meter.

Meters	×	Unit rate	=	Feet
60	×	3.3	≈	198

Hallie runs about 198 feet.

1. Complete the table with equivalent measures.

Meters	1	10	100	1,000
Feet				

2. Describe how to convert a given number of meters to feet.

_____

3. Use the facts that 1 meter ≈ 3.3 feet and 1 foot ≈ 0.3 meter to describe two ways to convert a given number of feet to meters.

Method 1: _____

Method 2: _____

Vocabulary

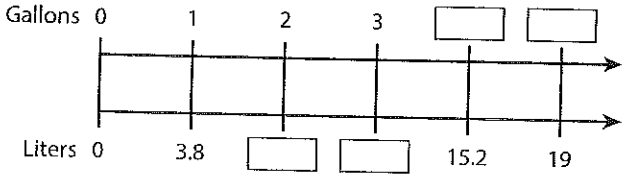
convert to change from one unit to another.

Solve.

Use the following situation for problems 4 and 5.

Some countries measure fuel for automobiles in liters. The United States measures fuel in gallons.

4 Complete the double number line to show the relationship between gallons and liters.



5 Suppose you are given an amount of fuel in liters. Describe how to find the equivalent number of gallons of fuel.

_____

6 Aditya knows that there are 3.9 inches in 10 centimeters. Tell whether each statement is *True* or *False*.

a. The unit rate for inches per centimeter is 0.39. ☐ True ☐ False

b. 1 centimeter is larger than 1 inch. ☐ True ☐ False

c. 30 centimeters is about 3.1 inches. ☐ True ☐ False

7 There are about 2.2 pounds in 1 kilogram. Estimate whether 15 kilograms is greater than or less than 30 pounds. Explain your reasoning.

_____

_____

_____

_____

_____

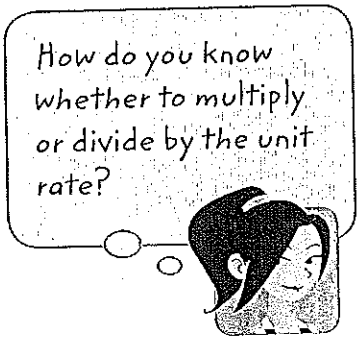
Name: _____

Convert Between Measurement Systems

Solve the problems.

1 Henri knows that 1 foot ≈ 0.3 meter. He says that 100 feet is about 3 meters. Is he correct? Explain your answer.

Show your work.



Solution: _____

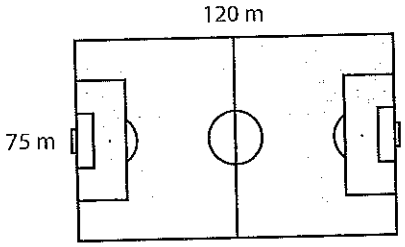
2 The length and width of a soccer field are shown in meters. Which measure best approximates the perimeter of the field in yards?
Use 1 meter ≈ 1.09 yards.

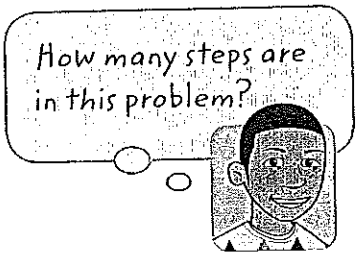
A 425 yards

B 390 yards

C 213 yards

D 131 yards





3 Sabine and Jack know that 1 kilogram ≈ 2.2 pounds and 1 pound ≈ 0.454 kilogram. They each write an expression to convert 50 pounds to kilograms. Is either student correct? Explain how you know, and find the correct answer to the nearest kilogram.

Sabine: 50 pounds ÷ 2.2 Jack: 50 pounds × 0.454

_____

_____

_____

_____

Solve.

4 An aquarium has a capacity of 20 gallons. Which measurement is the closest equivalent in liters? Use 1 gallon ≈ 3.8 liters.

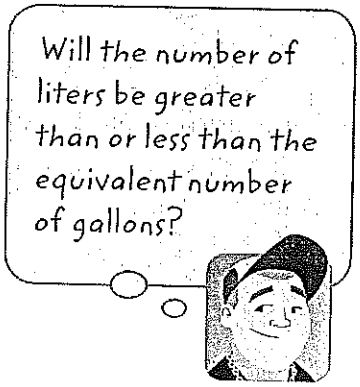
A 5 liters

B 23.8 liters

C 38 liters

D 76 liters

Harper chose **A** as the correct answer. How did she get that answer?



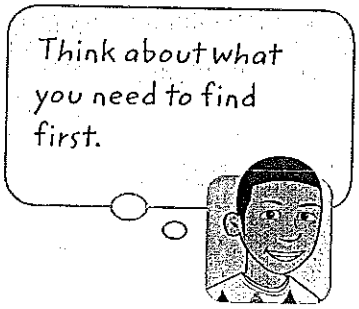
_____

_____

5 Use the equivalent measures given in the box to convert a speed of 15 miles per hour to meters per second. Round your answer to the nearest tenth.

1 mile ≈ 1,609 meters
1 hour = 60 minutes
1 minute = 60 seconds

Show your work.

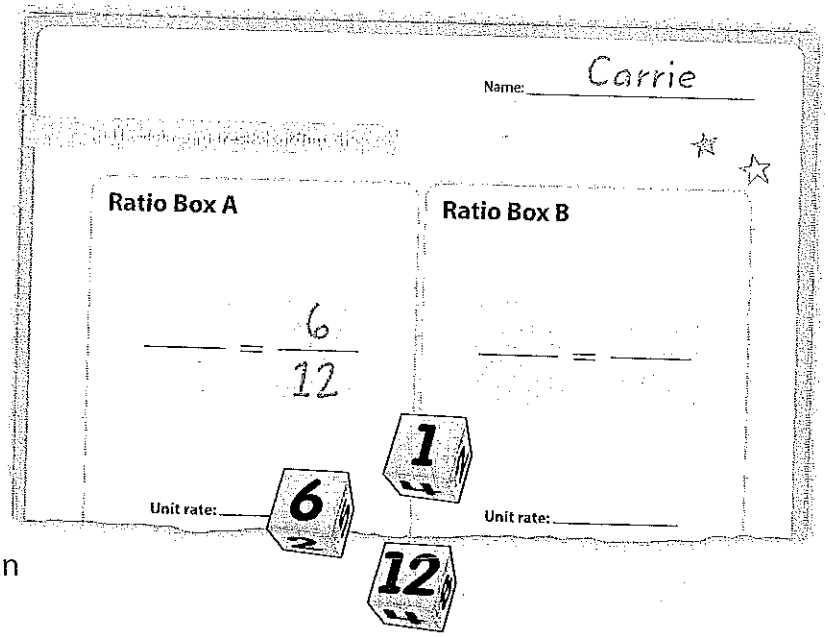


Solution: _____

Unit 1 Game

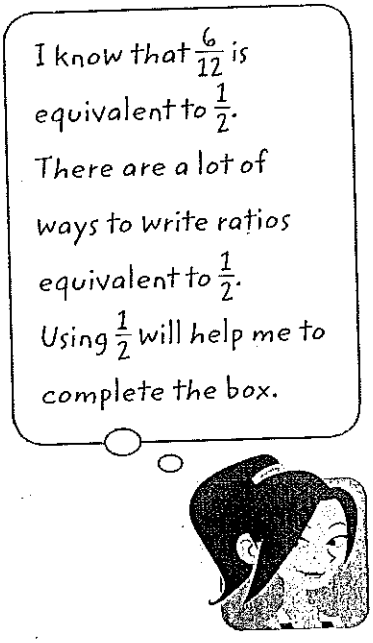
Name: _____

What you need: 2 Recording Sheets (1 for each player), number cubes (two labeled 1–6 and one labeled 4, 6, 8, 9, 10, 12)



Directions

- Your goal is to create two equivalent ratios in each Ratio Box on the Recording Sheet and find the unit rate for each set of equivalent ratios.
- Take turns. Roll all three number cubes. Pick two of them to make a ratio. You may choose to roll one, two, or all three number cubes again before picking two numbers.
- Name the ratio. You can write the ratio in any Ratio Box that has a blank space.
- If a Ratio Box already has one ratio, you can write the ratio in the blank space ***if*** it is equivalent to the ratio that is already in the Ratio Box.
- When you have two equivalent ratios in a Ratio Box, calculate the unit rate and write it in the space provided.
- Continue until one player has found four equivalent ratios and unit rates.



Name: _____

Ratio Box A

_____ = _____

Unit rate: _____

Ratio Box B

_____ = _____

Unit rate: _____

Ratio Box C

_____ = _____

Unit rate: _____

Ratio Box D

_____ = _____

Unit rate: _____

Unit 1 Practice

Name: _____

Number Sense

In this unit you learned to:	Lesson
write a ratio to describe the relationship between two quantities.	1
find the rate and unit rate associated with a given ratio.	2
compare ratios and find equivalent ratios.	3
solve unit rate problems.	4A
convert between measurement systems.	4B
convert between fractions, decimals, and percents.	5A
solve percent problems.	5B

Use these skills to solve problems 1–6.

1 Hui walks at a constant speed when he walks for exercise. The table shows how many miles Hui can walk in different amounts of time. Complete the table.

Number of Miles	Number of Minutes
$\frac{1}{2}$	6
1	
	24
	42

2 Two identical boxes of softballs weigh a total of 480 ounces. Sixteen identical boxes of baseballs weigh a total of 224 pounds. Does a box of baseballs weigh more or less than a box of softballs? Explain.

_____

_____

_____

_____

Solve.

3 At basketball practice, Kyla made 60 free throws. This was 80% of her attempts. How many free throws did Kyla attempt?

A 48 free throws

B 68 free throws

C 75 free throws

D 80 free throws

4 Jolene can read 10 pages in 20 minutes. How fast can she read? Select all that apply.

A 5 pages every 10 minutes

B 2 pages every 1 minute

C 1 page every 2 minutes

D $\frac{1}{2}$ page every 1 minute

5 Philip has 5 red counters, 6 yellow counters, and 9 green counters. Tell whether each statement is *True* or *False*.

a. The ratio of yellow counters to green counters is 2 : 3. ☐ True ☐ False

b. The ratio of red counters to the total number of counters is 1 to 3. ☐ True ☐ False

c. The ratio of all counters to yellow counters is $\frac{10}{3}$. ☐ True ☐ False

d. Green counters make up 45% of all the counters. ☐ True ☐ False

6 Dawit was earning $100 per week in January. He got a raise of 10% in March, but then he had a 10% reduction in his weekly pay after changing jobs in August. Was Dawit's weekly pay after August higher, lower, or the same as it was in January? Explain.

Unit 1 Performance Task

Name: _____

Answer the questions and show all your work on separate paper.

Your school has been awarded a $2,000 grant. You are using the money to set up an office for the science club. The items that you are considering are shown in the table. You must buy at least one of each item. You can buy more than one of any of the items as long as you stay within the $2,000 budget.

The store that sells these products has offered to give you the following discounts.

- 10% off any television over $300
- 15% off any laptop
- 5% off any printer or scanner

Television	Laptop	Printer	Scanner
32-inch $230	15-inch screen $400	Black $120	Basic scanner $120
40-inch $320	17-inch screen $460	Color $250	Scanner and color copier $300
42-inch $400	Touch screen $500		

Help the science club make a plan.

- Tell the items that you will buy.
- Calculate the total cost, including all discounts.
- Find the amount left over from the grant.

Checklist

Did you . . .

- ☐ complete all the necessary calculations?
- ☐ label all the prices in your work?
- ☐ check to make sure your total is within the budget?

Reflect on the Process Standards

After you complete the task, choose one of the following questions to answer.

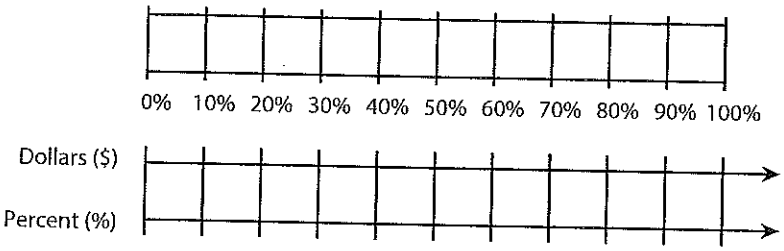
1 **Persevere** Did you use estimation to get an idea of about how many of each item you might order? Explain.

2 **Make Sense of Problems** How did you decide which items to buy?

Word Bank Here are some words that you might use in your answer.

percent	add	round
decimal	sum	estimate
multiply	total	subtract

Models Here are some models that you might use to find the solution.



Sentence Starters Here are some sentence starters that might help you explain your work.

I chose to buy _____

To find the amount of the discount _____

The price after the discount _____

Unit 1 Vocabulary

Name: _____

My Examples

corresponding terms

numbers that are in same position in two or more related patterns

ordered pair

a pair of numbers that locate a point on a coordinate plane

ratio

a comparison of two quantities

rate

a ratio that compares the first quantity in a ratio to only one of the second quantity

unit rate

the numerical part of the rate, without the units; the number in a rate that is being compared to 1

equivalent ratios

two or more ratios that are equal to one another

24 : 2, 36 : 3, 48 : 4

My Words

My Examples

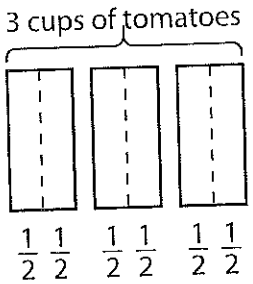
Name: _____

Prerequisite: How do you divide with unit fractions?

Study the example problem showing division of a whole number by a unit fraction. Then solve problems 1–7.

Example Problem

Karl puts $\frac{1}{2}$ cup of chopped tomatoes into each salad he makes. How many salads can he make with 3 cups of tomatoes?



The model represents the problem. You can use the model to write a division equation and a multiplication equation.

$3 \div \frac{1}{2} = 6$ $\quad\quad$ $3 \times 2 = 6$

Both equations show that Karl can make 6 salads with 3 cups of tomatoes.

1. Explain how the model represents $3 \div \frac{1}{2} = 6$.

_____

_____

2. Explain how the model represents $3 \times 2 = 6$.

_____

_____

3. Suppose Karl uses 5 cups of tomatoes. How many salads can he make? Write both a division equation and a multiplication equation to show your solution.

_____

_____

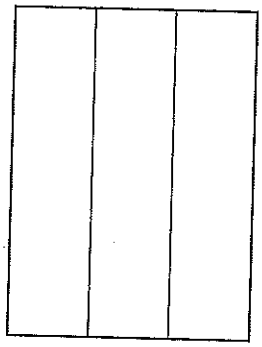
Vocabulary

unit fraction a fraction with a numerator of 1.

$\frac{1}{3}$, $\frac{1}{8}$, and $\frac{1}{12}$ are unit fractions.

Solve.

4 Four students are sharing $\frac{1}{3}$ carton of yogurt equally. Complete the steps to find what fraction of the carton each student gets.



a. The model at the right represents 1 carton. Shade the model to show $\frac{1}{3}$ carton.

b. Divide the model into 4 equal parts by drawing horizontal lines to represent sharing among 4 students. Shade one row to show $\frac{1}{4}$.

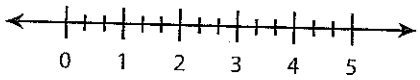
c. Complete the equation to show what fraction of the carton of yogurt each student gets.

$\frac{1}{3} \div 4 =$ _____ carton of yogurt

5 Use the model in problem 4 to write a multiplication equation that can be used to solve the problem.

_____

6 Find $2 \div \frac{1}{3}$. Explain how to use the number line to find the answer.



_____

7 Ana has $\frac{1}{2}$ hour of free time. She divides the time equally between walking her dog and playing her favorite song on the piano. If she plays the song 3 times, how long is the song? Give your answer as a fraction of an hour. Write division equations to represent the problem.

Show your work.

Solution: _____

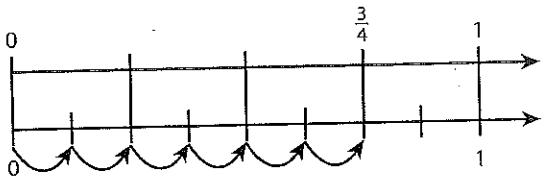
Name: _____

Divide by a Fraction

Study the example problem showing division of a fraction by a fraction. Then solve problems 1–10.

Example

Mr. Garcia has $\frac{3}{4}$ yard of ribbon to make badges for winners of the science fair. He uses $\frac{1}{8}$ yard of ribbon for each badge. How many badges can Mr. Garcia make?



6 eighths

Find the number of eighths in $\frac{3}{4}$. Use the number lines.

$\frac{3}{4} \div \frac{1}{8} = 6$

Mr. Garcia can make 6 badges.

1. What does $\frac{3}{4}$ on the top number line represent?

_____

2. What does each equal part on the bottom number line represent?

_____

3. How many eighths are in $\frac{3}{4}$? _____

4. Suppose Mr. Garcia is making badges using $\frac{3}{8}$ yard of ribbon for each badge. He starts with the same amount of ribbon, $\frac{3}{4}$ yard. How many badges can he make? Write a division equation that supports your answer.

_____

Solve.

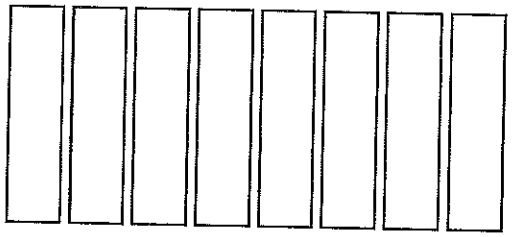
Use the following situation to solve problems 5–9.

Rosa puts $\frac{2}{3}$ cup of vegetable mixture in 1 tortilla. She has 8 cups of vegetable mixture.

5 Rosa says that to find how many tortillas she can fill, she first finds find how many $\frac{1}{3}$ cups are in 8 cups. What else must Rosa do to find how many tortillas she can fill?

6 Do you expect the number of tortillas Rosa can fill to be less than or greater than 8? Explain.

7 The rectangles represent 8 cups of vegetable mixture. Draw lines to divide each rectangle into thirds.



8 Circle groups of $\frac{2}{3}$ rectangle. How many groups are there? _____

9 Complete the division equation to show how many tortillas Rosa can fill.

$8 \div \frac{2}{3} =$ _____ tortillas

10 Mike pours $\frac{12}{8}$ cups of orange juice into serving glasses. Each glass holds $\frac{3}{4}$ cup. How many glasses can he fill? Use a common denominator to divide.

Show your work.

Solution: _____

Lesson 6

Name: _____

Study the example. Underline two parts that you think make it a particularly good answer and a helpful example.

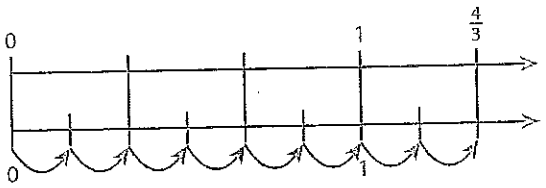
Example

Steve said that $\frac{4}{3} \div \frac{1}{6}$ equals $\frac{4}{6}$. How do you know without dividing whether Steve's statement is reasonable? Justify your answer by showing how to find the quotient.

Show your work. Use numbers, words, and models to explain your answer.

Steve's statement is not reasonable. The division $\frac{4}{3} \div \frac{1}{6}$ asks how many sixths are in $\frac{4}{3}$. $\frac{4}{3}$ is greater than 1, and there are 6 sixths in 1. So I know there are more than 6 sixths in $\frac{4}{3}$. That means the quotient must be greater than 1. It could not be a fraction less than 1, such as $\frac{4}{6}$.

I drew a number line model to find the quotient. The top number line is divided into thirds and shows $\frac{4}{3}$. The bottom number line is divided into sixths and shows that there are 8 sixths in $\frac{4}{3}$. So $\frac{4}{3} \div \frac{1}{6} = 8$.



8 sixths

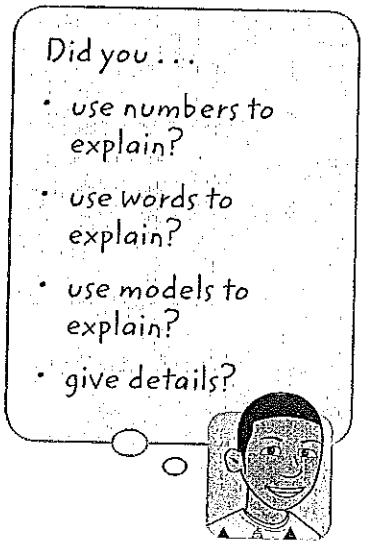
Where does the example . . .

- use numbers to explain?
- use words to explain?
- use models to explain?
- give details?

Solve the problem. Use what you learned from the model.

Brenda said that $\frac{5}{2} \div \frac{1}{4}$ equals 10. How do you know without dividing whether Brenda's statement is reasonable? Justify your answer by showing how to find the quotient.

Show your work. Use numbers, words, and models to explain your answer.



Divide Multi-Digit Numbers

Name: _____

Prerequisite: Divide Using Partial Quotients

Study the example problem showing division with a 2-digit divisor. Then solve problems 1–6.

Example

A farmer sells milk in crates that hold 18 bottles. She has 612 bottles of milk. How many crates can the farmer fill?

To solve, divide 612 by 18. Use the partial-quotients model.

```
    34   ← quotient
    ---
     4   ← partial quotient
    30   ← partial quotient
18)612
 -540   ← 18 × 30
  ---
   72
  -72   ← 18 × 4
  ---
    0
```

The farmer can fill 34 crates.

1. In the example problem, why is the first partial quotient 30 and not 3?

_____

_____

_____

2. Why is the second partial quotient 4 and not 40?

_____

_____

_____

3. How do you use the partial quotients to find the quotient?

_____

Vocabulary

partial quotient a strategy used to divide multi-digit numbers. The quotients you get in each step are called "partial quotients."

Solve.

4 A school collected 1,204 cans of food during a food drive that lasted 28 days. How many cans were collected on average each day?

Show your work.

Solution: _____

5 Tracey is trying to figure out how many rows of chairs are needed to seat 888 students, with 24 chairs in each row. She writes the equation $24 \times \square = 888$.

a. What related division equation could Tracey use?

_____

b. How many rows of chairs are needed? _____

6 Ricardo used partial quotients to divide 1,862 by 38 and got 13.

a. How could Ricardo decide whether his answer is reasonable? Is his answer reasonable?

_____

_____

b. Is Ricardo's quotient correct? If not, explain and correct his error. If so, show that he is correct.

_____

_____

_____

Lesson 8

Name: _____

Using the Division Algorithm

Study the example problem showing how to use the division algorithm. Then solve problems 1–6.

Example

There are 896 people at the school's basketball game. The stands are divided into 16 equal sections. If each section has the same number of people, how many people are in each section?

First, estimate the quotient: $900 \div 20 = 45$.

You can use the division algorithm to divide 896 by 16.

$$\begin{array}{r} 56 \\ 16\overline{)896} \\ -\ 80\downarrow \\ \hline 96 \\ -\ 96 \\ \hline 0 \end{array}$$

There are 56 people in each section.

1. Why is the 5 in the quotient written above the 9 in the dividend? What does the 5 mean in the quotient?

_____

_____

2. Divide 896 by 16 using partial quotients. Compare the methods. For example, how is the 80 in the standard algorithm expressed in the partial-quotients method?

_____

_____

_____

_____

Solve.

3 A train traveled 936 miles at a constant speed in 12 hours.

a. How can you find the number of miles the train traveled each hour?

_____

b. What is a reasonable estimate for the quotient?

_____

c. How many miles did the train travel each hour?

_____

4 Zachary is reading a book that has 420 pages. The book is divided into 28 chapters. What is the average number of pages per chapter?

_____

5 An art teacher has 816 toothpicks to distribute equally among 16 students. How many toothpicks does each student get?

_____

6 A local theater charges $26 for each adult ticket and $17 for each student ticket. For one show, the theater took in $988 from adults and $731 from students. How many people attended the performance?

Show your work.

Solution: _____

Name: _____

Dividing with 5-Digit Dividends

Study the example problem showing how to divide with a 5-digit dividend. Then solve problems 1–7.

Example

A company is going to divide $77,024 evenly among its 32 employees for bonuses this year. What will each person get for a bonus?

First, estimate the quotient: 75,000 ÷ 30 = 2,500.

You can use the division algorithm to find 77,024 ÷ 32.

```
   2407
32)77,024
 − 64
   130
 − 128
    22
 −  0
    224
 − 224
      0
```

Each person will get $2,407.

1. What does the 64 mean in the standard algorithm?

_____

2. Why is there a 0 in the quotient?

_____

_____

3. How can you use multiplication to check your answer?

_____

Solve.

4 A sporting goods company ships their baseballs in cartons that hold 48 balls. How many cartons will they need to ship 1,400 baseballs?

a. How can you find the number of cartons?

_____

b. What is the quotient? What does the remainder mean?

_____

c. How many cartons will the company need? _____

5 Henry has a length of string that is 2,850 centimeters long. He needs some pieces that are 78 centimeters long for an art project. What is the greatest number of pieces that Henry can cut? _____

6 One of the buses in a bus company's fleet recorded 46,736 miles traveled. This was after a total of 92 trips. What was the average distance traveled on each trip?

_____

7 A citrus grower harvested 2,419 grapefruit and 4,395 oranges last season. He packaged the grapefruit in boxes of 18 and the oranges in boxes of 30. After packing as many boxes as possible, how many pieces of fruit did the grower have left over?

Show your work.

Solution: _____

Name: _____

Divide Multi-Digit Numbers

Solve the problems.

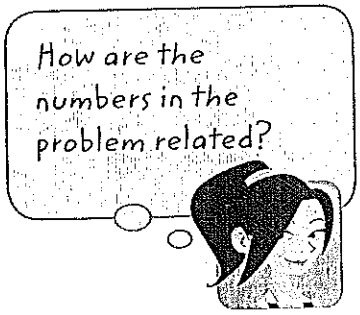
1 A farmer is packing 2,205 pounds of potatoes into boxes. Each box can hold 49 pounds. How many boxes can the farmer fill?

A 10

B 20

C 45

D 46



2 What is the quotient of 6,135 and 15?

A 40 R9

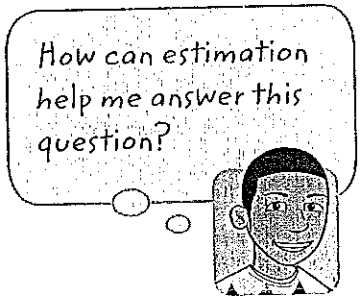
B 49

C 409

D 6,120

Olivia chose **B** as the correct answer. How did she get that answer?

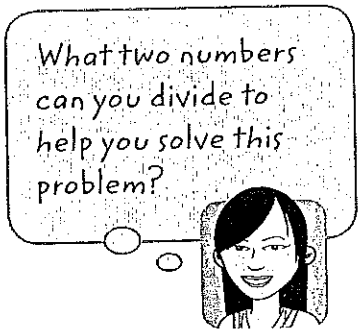
_____



3 A recipe for fruit punch calls for 2 cans of pineapple juice and 3 cans of orange juice. Hiri is making a large batch of juice for a community function and uses 72 cans of orange juice. How many cans of pineapple juice should he use?

Show your work.

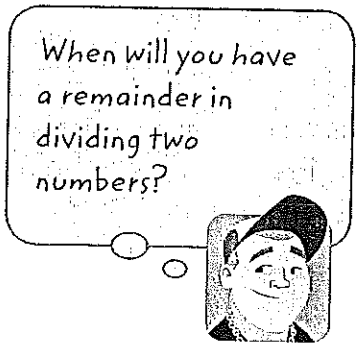
Solution: _____



Solve.

4 Tell whether each quotient has a remainder. Select *Yes* or *No*.

a.	782 ÷ 17	☐ Yes	☐ No
b.	1,296 ÷ 22	☐ Yes	☐ No
c.	4,256 ÷ 38	☐ Yes	☐ No



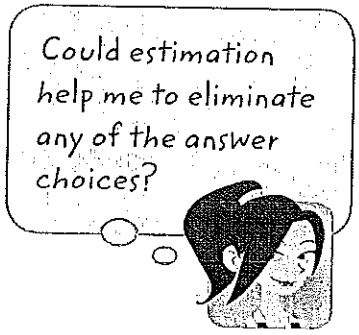
5 Which of these have the quotient 128? Select all that apply.

A 2,048 ÷ 16

B 2,986 ÷ 24

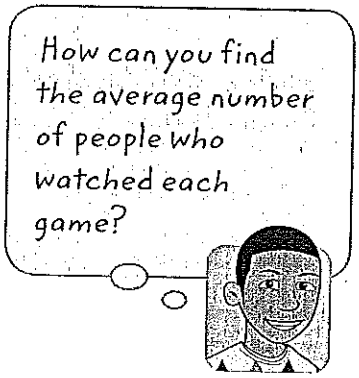
C 5,760 ÷ 45

D 6,576 ÷ 67



6 East High School had a total of 12,510 people in attendance during their 15-game soccer season. West High School had a total of 14,310 people for 18 games. On average, which school had a greater number of people watching per game? How much greater?

Show your work.



Solution: _____

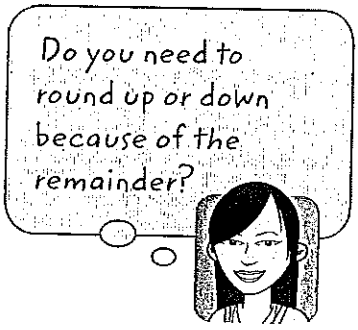
7 A lightbulb manufacturer produces 20,000 lightbulbs each week. They ship the lightbulbs to stores in cartons of 75. How many cartons are needed to ship 20,000 lightbulbs?

A 50 cartons

B 250 cartons

C 266 cartons

D 267 cartons



Common Factors and Multiples

Name: _____

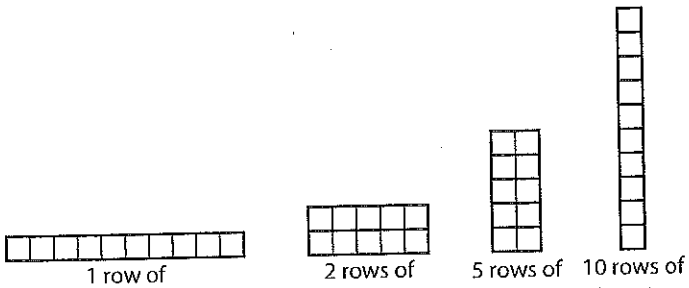
Prerequisites: Factor Pairs

Study the example problem about factors and factor pairs. Then solve problems 1–9.

Example

Nancy has 10 movie posters. She wants to hang them on a wall in equal rows. Find all the ways that she can arrange the posters.

Nancy can arrange the posters in 4 ways.



1. The equation $1 \times 10 = 10$ represents the first way that Nancy can arrange the posters. Write three more equations to represent all of the ways that Nancy can arrange the posters.

_____

2. List the four factors of 10.

_____

3. Write the two factor pairs of 10.

_____

4. What do the factor pairs represent in this situation?

_____

5. How would the factor pairs change if Nancy had only 5 posters to arrange? Explain.

_____

_____

_____

Vocabulary

factor a number you multiply.

factor pair two numbers that are multiplied together to give a product.

multiple the product of a number and any other whole number.

$2 \times 4 = 8$

2 is a factor of 8.

2 and 4 are a factor pair.

8 is a multiple of 2.

Solve.

6 Tell whether each statement about the factors of 24 is *True* or *False*.

a. An arrangement of 24 objects could be 4 equal rows of 6. ☐ True ☐ False

b. 2 and 12 is a factor pair. ☐ True ☐ False

c. 24 is not a factor because a number cannot be a factor of itself. ☐ True ☐ False

d. All of the factors of 24 are 1, 2, 6, 12, and 24. ☐ True ☐ False

7 Mina baked 50 muffins. She is arranging the muffins on plates. She wants the same number of muffins on each plate. Complete the table to show the different ways that Mina can arrange the muffins. Then list the factor pairs of 50.

Number of Plates						
Number of Muffins on Each Plate						

Factor pairs of 50: _____

8 Jill arranged her baseball cards in 4 rows of 9 cards. Then she arranged the cards in 2 rows of 18 cards. How many other ways can Jill arrange her baseball cards in equal rows?

Show your work.

Solution: _____

9 Look at problem 8. Sam has fewer baseball cards than Jill. There are only three ways that he can arrange his cards in equal rows. Write all the possible numbers of baseball cards that Sam could have.

_____

Lesson 11

Name: _____

Greatest Common Factor

Study the example showing how to solve a problem using the greatest common factor (GCF). Then solve problems 1–6.

Example

Alice is making balloon bunches from 6 red balloons and 15 blue balloons. She wants the same number of red balloons and the same number of blue balloons in each bunch. What is the greatest number of balloon bunches that Alice can make using all the balloons?

You can make a table to show all the factors of 6 and all the factors of 15.

Red Balloons

Number of Bunches	1	2	3	6
Number of Red Balloons	6	3	2	1

Blue Balloons

Number of Bunches	1	3	5	15
Number of Blue Balloons	15	5	3	1

The common factors in the number of bunches are 1 and 3. The GCF is 3.

The greatest number of balloon bunches that Alice can make is 3.

1. What does the greatest common factor represent in this situation?

_____

_____

2. Alice decides to use all of the balloons to make 3 balloon bunches. How many red balloons and how many blue balloons are in each bunch?

_____

3. Alice makes 2 bunches of balloons. There are the same number of red balloons and the same number of blue balloons in each bunch. Did Alice use all of the balloons?

_____

Solve.

4 A dentist is making packages of toothbrushes and toothpaste for his patients. He has 12 toothbrushes and 18 tubes of toothpaste. Each package will have the same number of toothbrushes and the same number of tubes of toothpaste.

a. What is the greatest number of packages that the dentist can make using all the toothbrushes and tubes of toothpaste?

Show your work.

Solution: _____

b. How many toothbrushes and how many tubes of toothpaste will be in each package?

_____

5 Luis has 8 petunias, 16 carnations, and 20 pansies to plant in flowerpots. If he plants the same number of each type of flower in the flowerpots, how many flowerpots will he use? How many of each type of flower will be in each flowerpot?

_____

_____

6 Use the GCF and the distributive property to write $24 + 40$ as a product.

_____

_____

Name: _____

Least Common Multiple

Study the example problem showing how to find the least common multiple (LCM) to solve problems. Then solve problems 1–8.

Example

Miriam is buying plates and cups for a party. She wants the same number of each. Plates are sold in packs of 8. Cups are sold in packs of 12. What is the least number of plates and cups that Miriam can buy?

You can list the multiples of each number.

8: 8, 16, 24, 32, 40, 48, 56, 64, 72 ...

12: 12, 24, 36, 48, 60, 72, 84, 96 ...

The least common multiple is 24, so the least number of plates Miriam can buy is 24, and the least number of cups she can buy is 24.

1. John says that this means that Miriam needs to buy 24 packs of plates and 24 packs of cups. Is John correct? Explain your answer.

_____

_____

2. What is the least number of packs of plates and cups that Miriam can buy?

_____

3. Name three other common multiples of 8 and 12.

_____

4. Could Miriam buy exactly 40 plates and 40 cups? Explain.

_____

_____

Solve.

5 Pizza is served in the school cafeteria every fourth school day. Tacos are served every third school day. Both pizza and tacos were served today. In how many school days will pizza and tacos be served on the same day again?

Show your work.

Solution: _____

6 Look at problem 5. If the pattern continues, will pizza and tacos be served on the same day in 21 school days? Explain why or why not.

_____

7 Every ninth person in line at a movie theater gets free popcorn. Every sixth person gets free apple juice. Shani says that the thirty-sixth customer will be the first customer to get both free popcorn and free apple juice. Is she right? If not, describe her mistake.

_____

_____

_____

8 Gary has guitar lessons every 5 days and band practice every 4 days. His first band practice is in 4 days and his first guitar lesson is in 5 days. In 100 days, how many times will Gary have had guitar lessons and band practice on the same day? Explain how you know.

_____

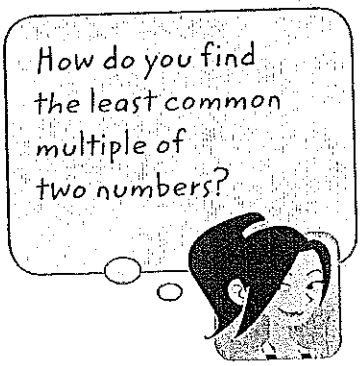
_____

Name: _____

Solve the problems.

1 Rafael wants to buy the same number of gift bags and bows. Gift bags are sold in packs of 6. Bows are sold in packs of 9. What is the least number of gift bags and bows that Rafael can buy?

Show your work.



Solution: _____

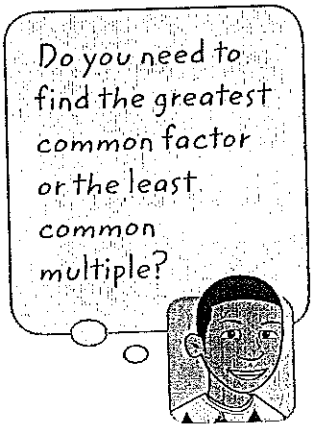
2 While at school, Brian has a math quiz every 6 days and a science quiz every 4 days. On February 15, he had both tests. Assuming no school days off, when will he have both tests on the same day again?

February

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29			

March

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31



A February 27

B February 29

C March 2

D March 16

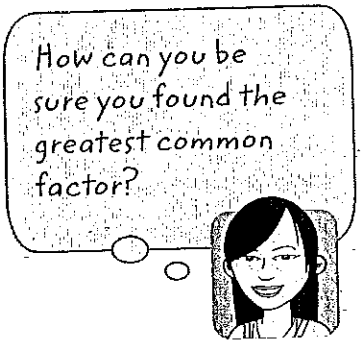
3 Which expression uses the greatest common factor and the distributive property to write 16 + 36 as a product?

A 2(8 + 18)

B 6(10 + 30)

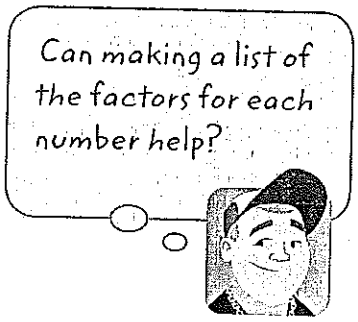
C 2(8) + 2(18)

D 4(4 + 9)



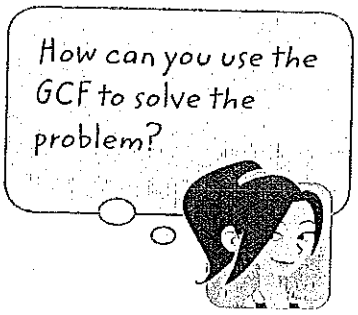
Solve.

4 Tell whether each statement about the factors of 20 and 30 is *True* or *False*.



a.	The greatest common factor is 5.	☐ True	☐ False
b.	2 is a common factor.	☐ True	☐ False
c.	15 and 3 are a factor pair of 30.	☐ True	☐ False
d.	10 is a factor of 20.	☐ True	☐ False

5 Sally is arranging her books on shelves. She has 16 adventure books, 32 mysteries, and 12 biographies. She wants each shelf to have the same number of each type of book. What is the greatest number of shelves that Sally will use if she puts all the books on shelves? How many of each type of book will be on each shelf?

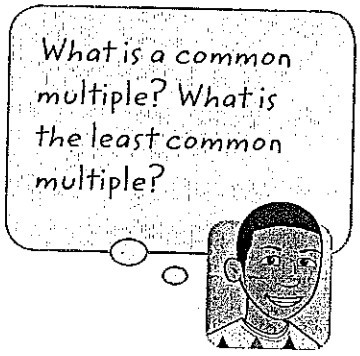


Show your work.

Solution: _____

_____

6 What is the least common multiple of 12 and 10?



A 2 **C** 60

B 50 **D** 120

Rachel chose **D** as the correct answer. How did she get that answer?

_____

_____

Lesson 12

Understand Positive and Negative Numbers

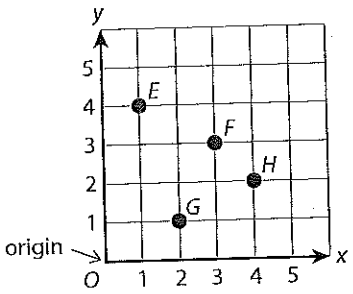
Name: _____

Prerequisite: **How can you graph points on the coordinate plane?**

Study the example showing how to name ordered pairs on the coordinate plane. Then solve problems 1–9.

Example

An ordered pair (x, y) describes the location of a point on the coordinate plane.



The first number in the ordered pair is the *x*-coordinate. It tells how many units the point is from the origin on the *x*-axis.

The second number is the *y*-coordinate. It tells how many units the point is from the origin on the *y*-axis.

The ordered pair for point *E* is (1, 4).

The ordered pair (0, 0) names the origin.

1. The *x*-coordinate of point *F* is ____ because it is ____ unit(s) to the right of the origin. The *y*-coordinate of point *F* is ____ because it is ____ unit(s) up from the origin. The ordered pair for point *F* is (____, ____).

2. Ray says that the ordered pair for point *G* is (1, 2). Is Ray correct? Why or why not?

_____

_____

3. Write the ordered pair for point *H*. Explain how you got your answer.

_____

_____

_____

4. Plot and label point *J* at (1, 2) on the coordinate plane.

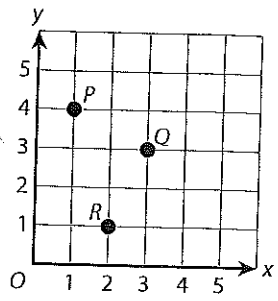
Vocabulary

coordinate plane a two-dimensional space formed by two perpendicular number lines called axes.

origin the point (0, 0) where the *x*-axis and *y*-axis intersect.

ordered pair a pair of numbers (x, y) that describe the location of a point on the coordinate plane.

Use the coordinate plane to solve problems 5–7.



5 Write the ordered pairs for points *P*, *Q*, and *R*.

_____

6 Use the ordered pairs in the table to plot and label points *S*, *T*, and *U* on the coordinate plane.

Point	*S*	*T*	*U*
x-coordinate	1	3	2
y-coordinate	3	1	5

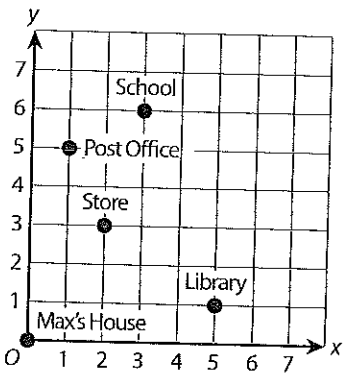
7 Choose a point on the coordinate plane. Describe its location in relation to the origin.

_____

_____

Use the following situation to solve problems 8–9.

Max drew a map of his neighborhood with his house located at the origin.



8 Which ordered pair describes the location of the library?

A (1, 1)

B (1, 5)

C (5, 1)

D (5, 5)

9 The park is located at (7, 5). Plot and label the location of the park on the map. Describe the location of the park in relation to the location of the school.

_____

_____

Lesson 12

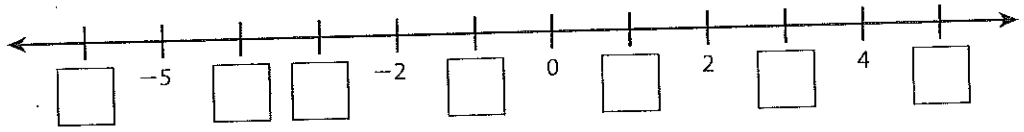
Name: _____

Understand Positive and Negative Numbers

Study the example showing positive and negative numbers on a number line. Then solve problems 1–10.

Example

Gareth is graphing some numbers and their opposites on the number line below. He has partially completed the number line as shown.



1. Fill in the missing numbers on Gareth's number line.

2. Choose a pair of numbers from the number line that you know are opposites. Explain how you know that the numbers are opposites.

_____

_____

3. Graph a point at 4 and at the opposite of 4 on the number line.

4. Mary says that the opposite of 0 is 0. Is she correct?

_____

_____

5. Name two numbers that are not integers but that are opposites. Explain how you know.

_____

_____

_____

Vocabulary

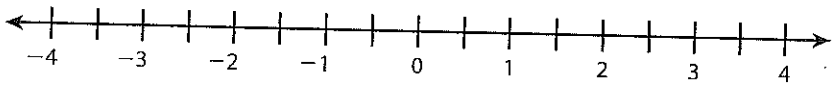
opposites numbers that are the same distance from 0 but on opposite sides of 0.

integers the set of whole numbers and their opposites.

Solve.

6 Use the number line below to graph and label each number and its opposite.

$1\frac{1}{2}$ $\quad -3.5 \quad$ 2.5



7 Pavel said that he could graph −5 by counting 5 units to the left of 5. Is he correct? Explain.

_____

_____

_____

8 Write a positive or a negative number to represent each situation.

a. 3 degrees below 0°F _____

b. 6 feet above sea level _____

c. lost 5 pounds _____

d. found $4 _____

9 A family wants to save $100 each month. They record their progress toward this goal at the end of each month. In January they saved $120 and recorded +$20 at the end of the month. What should they record for the month of February if they only saved $80 that month? Explain.

_____

10 When would you use a negative number to describe a real-world amount? Give an example.

_____

_____

_____

Lesson 12

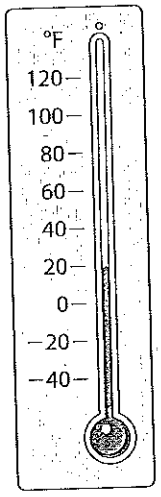
Name: _____

Study the example. Underline two parts that you think make it a particularly good answer and a helpful example.

Example

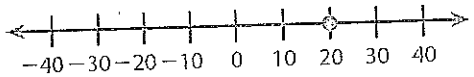
The thermometer shows the temperature outdoors at noon. The temperature at midnight was the opposite of the temperature at noon. Beth says that the temperature at midnight was −40°F. Is Beth correct? Explain your reasoning.

Show your work. Use a model, positive and negative numbers, and words to explain your answer.



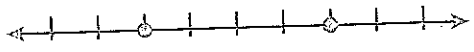
The thermometer shows that the temperature at noon was 20°F.

I can draw a number line to model the temperature.



I know that the opposite of a number is the number that is the same distance from 0 in the opposite direction on a number line. So I can use the number line to see that the opposite of 20 is −20.

20 is 20 units to the right of 0 on the number line, and −20 is 20 units to the left of 0 on the number line.



So the temperature at midnight was −20°F. Beth was not correct. The temperature was not −40°F.

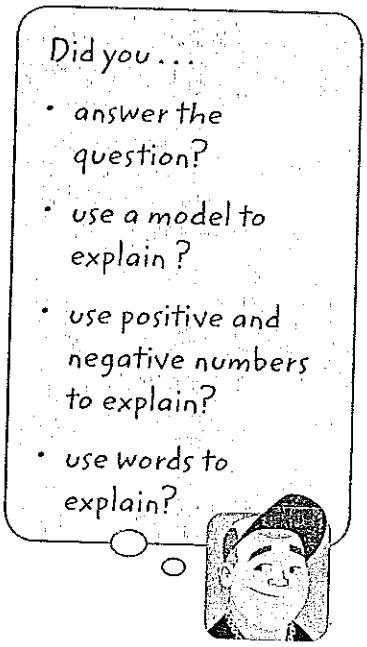
Where does the example . . .

- answer the question?
- use a model to explain?
- use positive and negative numbers to explain?
- use words to explain?

Solve the problem. Use what you learned from the model.

Alex is practicing his dives at a pool. He dives from a diving board that is 15 feet above the surface of the water. His dive takes him 15 feet below the surface of the water. Alex says that the two distances are opposites, so his total dive distance is $15 + (-15) = 0$ feet. Are the two distances opposites? Is Alex's total dive distance correct? Explain your reasoning.

Show your work. Use models, positive and negative numbers, and words to explain your answer.



Lesson 13

Absolute Value and Ordering Numbers

Name: _____

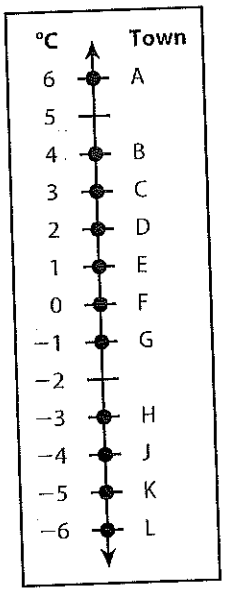
Prerequisite: Understanding Integers

Study the example problem showing how to use positive and negative integers. Then solve problems 1–7.

Example

The model shows the temperatures in 11 towns one winter morning. Which town has a temperature that is the opposite of the temperature in Town C?

The temperature in Town C is 3°C. The opposite of 3 is the same distance from 0 but in the opposite direction. The temperature in Town H is −3°C. So Town H has the opposite temperature of Town C.



1. Which town has a temperature of −4°C?

_____

2. How can you find the town with a temperature that is the opposite of −4°C? Name the town with that temperature.

_____

_____

_____

_____

3. Barry pairs each town with another town that has the opposite temperature. Which town(s) cannot be paired? Explain.

_____

_____

_____

_____

_____

Vocabulary

positive number
a number greater than 0.

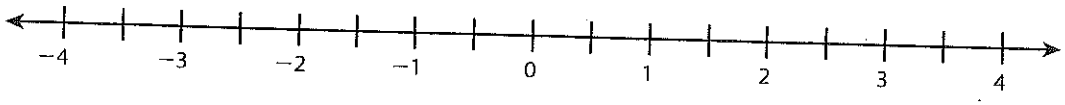
negative number
a number less than 0.

opposite two numbers are opposites if they are the same distance from 0 on the number line but on opposite sides of 0.

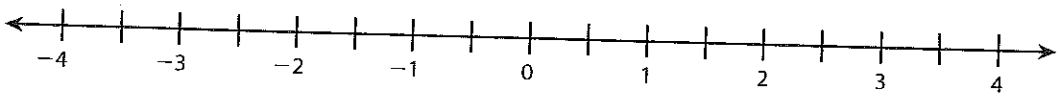
2 is a positive number.
−2 is a negative number.
2 and −2 are opposites.

Solve.

4 Graph and label the numbers 1.75, −2.5, and 0.2 on the number line. Then graph and label their opposites.



5 Graph and label the numbers $-3\frac{1}{2}$, $2\frac{1}{4}$, and $\frac{1}{2}$ on the number line. Then graph and label their opposites.



6 Write two numbers that fit each description.

a. a positive number and a negative number between 1 and −1

_____

b. a whole number and its opposite between −0.5 and 0.9

_____

c. a decimal and a fraction between −4 and −3

_____

7 Write your own problem about money or elevation that uses a number and its opposite. Solve the problem. Then explain what 0 means in your problem.

_____

_____

_____

_____

Name: _____

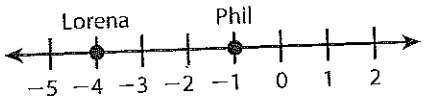
Compare Positive and Negative Numbers

Study the example problem showing how to compare numbers. Then solve problems 1–6.

Example

Phil and Lorena are playing golf. Phil's score after the first round is −1. Lorena's score is −4. The player with the lower score is the winner. Who wins?

Graph the two scores on a number line.



Numbers increase from left to right along a number line.
Use an inequality to compare the scores.
$-4 < -1$

Lorena's score is the lower score, so Lorena wins.

1. Write another inequality to compare the scores.

_____

2. Rory joins the game for the second round and wins that round. What can you say about where his score would appear on the number line? Explain.

_____

_____

_____

3. Rory, Lorena, and Phil play a third round of golf. Lorena's score is 1 in the third round. Phil ties Rory's score at −3. Write an inequality that shows why Lorena lost that round.

_____

Solve.

4 When asked to compare -9 and 2, Joshua wrote $-9 > 2$. Is Joshua correct? If not, explain and correct his error.

5 Tom is thinking of two numbers, a and b, where a is a positive number and b is a negative number.

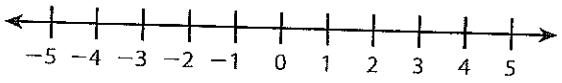
a. Write two inequalities that Tom can use to compare a and b. Explain how you know.

b. Choose two numbers for a and b, and then use them to write two inequalities.

6 Juanita was given this information about three integers, n, m, and p:

$n < 0, m < n, n < p$

a. Graph three points on a number line that could represent n, m, and p. Explain your choices.



b. Write two inequalities comparing m and p. Explain.

Name: _____

Ordering Positive and Negative Numbers

Study the example problem showing how to order positive and negative numbers. Then solve problems 1–7.

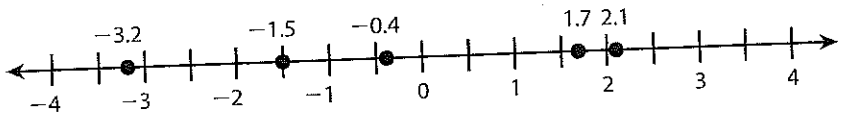
Example

Five students draw number cards at random and make a human number line. The table shows the number that each student drew.

Student	Number
Ina	−1.5
Joe	2.1
Kit	−3.2
Larry	1.7
Mai	−0.4

From left to right, how did the students arrange themselves to form the number line?

Plot each number on a number line.



1. Which student has the least number? Explain how you know.

2. Which student has the greatest number? Explain how you know.

3. Order the students from least to greatest.

4. Ned draws a number card with a −1. Where should Ned stand along the line of students?

Solve.

5 Abey made a table showing the lowest temperature for five towns during one week in winter.

Town	Temperature (°C)
J	−5.4
K	1.8
L	−2.3
M	4
P	−5.7

a. Order the towns from coldest to warmest.

b. The lowest temperature in Town Q that week was 0.6°C. If Abey wants to include Town Q in the ordered list, where should he put it?

6 The table shows the position of four fish relative to the surface of the water. Name all the fish swimming deeper than the carp.

Fish	Position (ft)
Bass	$-15\frac{1}{2}$
Trout	$-9\frac{7}{8}$
Pike	$-20\frac{1}{5}$
Carp	$-15\frac{3}{4}$

7 Plot points *A*, *B*, *C*, and *D* on a number line so that each statement is true: $B < 0, A < C, D > 0, B > C$.

Name: _____

Absolute Value and Ordering Numbers

Solve the problems.

1 A bird is flying at an elevation of 14 feet above the surface of the water. A fish is swimming the same distance below the surface of the water.

a. What number represents the position of the fish relative to the surface of the water? _____

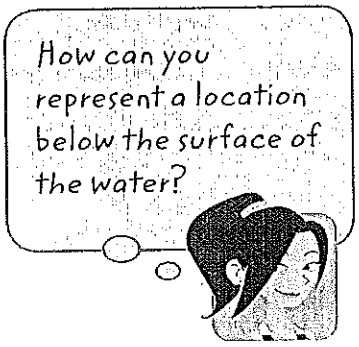
b. How does the absolute value of the number you wrote show that the distances are the same? Explain.

_____

_____

_____

_____



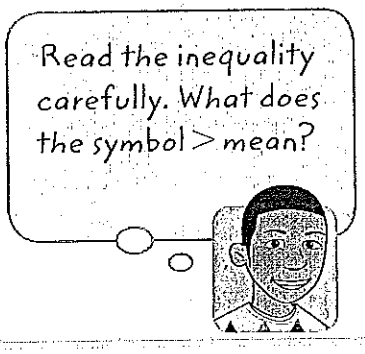
2 If $x > y$, which statement must be true?

A On a number line, y is to the left of 0.

B On a number line, x is to the right of 0.

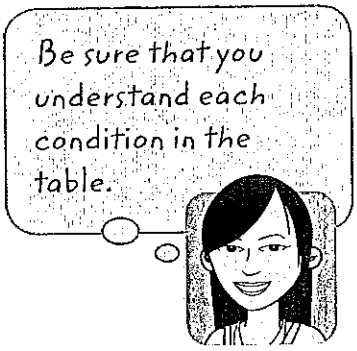
C On a number line, both x and y are positive.

D On a number line, y is to the left of x.



3 Ganesa wanted to write numerical examples for the inequality $a < b$, with the conditions described in the table. One of the conditions cannot be met. Complete the table. Indicate which condition cannot be met.

Condition	Numerical Example for $a < b$
$a < 0$ and $b < 0$	
$a < 0$ and $b > 0$	
$a > 0$ and $b < 0$	
$a > 0$ and $b > 0$	



Solve.

4 The table shows the temperatures for five towns.

Town	Z	Y	X	W	V
Temperature (°C)	−1.9	7.4	−12.2	6	−5.7

What is the correct order from warmest to coldest?

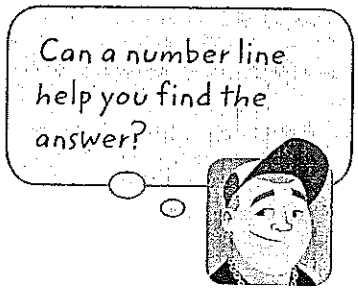
A X, V, Z, W, Y

B Z, V, X, W, Y

C X, Y, W, V, Z

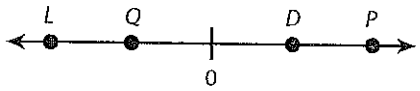
D Y, W, Z, V, X

Reyhan chose **C** as the correct answer. How did she get that answer?



_____

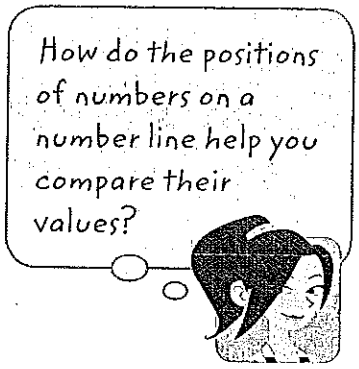
5 Look at the number line below. Select whether each statement is *True* or *False*.



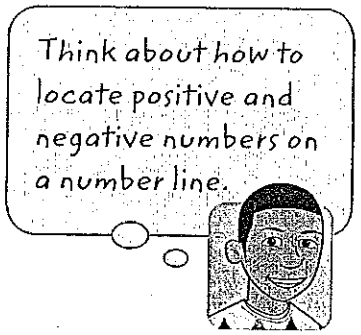
a. $L > P$ ☐ True ☐ False

b. $Q < D$ ☐ True ☐ False

c. $L < Q$ ☐ True ☐ False



6 A teacher poses this problem: I am thinking of four numbers, *a*, *b*, *c*, and *d*, where $a < 0$, $b < 0$, $c > 0$, and $d > 0$. What else do you need to know to plot the four numbers in the correct order on a number line? What two questions should you ask? Explain how the answers would help you plot the numbers on a number line.



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