Content Overview

Dear Family,

In our math class we are studying ratios, rates, and percent. We will work with tables, diagrams and equations. These will help your child to develop her or his understanding of ratios, rates, and percent as well as to learn methods for solving problems. You can help your child by asking him or her to explain the tables, diagrams and equations.

Here are some examples of the kinds of problems we will solve and the kinds of tables, diagrams, and equations we will use.

- Purple Berry juice is made from 2 cups of raspberry juice for every 3 cups of blueberry juice. How many cups of blueberry juice are needed for 11 cups of raspberry juice?

Table with Unit Rate

B	R
3	2
$\frac{3}{2}$	1
$\frac{33}{2}$	11

$\div 2$ $\div 2$
$\cdot 11$ $\cdot 11$

Equation

$\frac{2}{3} = \frac{11}{x}$
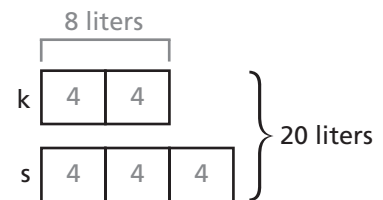
$2x = 33$

$x = \frac{33}{2}$

The answer is $\frac{33}{2}$ or $16\frac{1}{2}$ cups of blueberry juice.

- A juice company's KiwiBerry juice is made by mixing 2 parts kiwifruit juice with 3 parts strawberry juice. To make 20 liters of KiwiBerry juice, how much kiwifruit juice is needed?

Factor Puzzle

	k	KB
	2	5
1	2	5
4	8	20

Tape Diagram

8 liters

k | 4 | 4
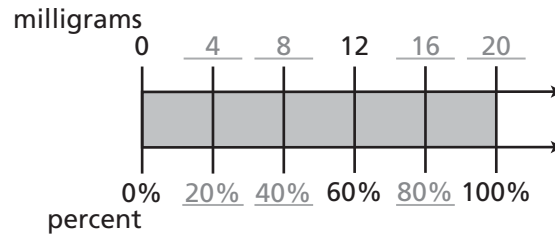s | 4 | 4 | 4

20 liters

The answer is 8 liters of kiwifruit juice.

continued ▶

- If 12 milligrams of niacin is 60% of the recommended daily allowance for niacin, then what is the recommended daily allowance for niacin?

Double Number Line Diagram

Equation

milligrams

0   4   8   12   16   20

0% 20% 40% 60% 80% 100%
percent

$$\frac{12}{x} = \frac{60}{100}$$

$$60x = 12 \bullet 100$$

$$x = \frac{12 \bullet 100}{60}$$

$$x = 20$$

The answer is 20 milligrams.

- A double number line can be used to convert between centimeters and millimeters. Complete the double number line to show how centimeters and millimeters are related.

Double Number Line Diagram

centimeters 0   1   2   3   4   5   6   7   8   9   10

millimeters 0   10   20   30   40   50   60   70   80   90   100
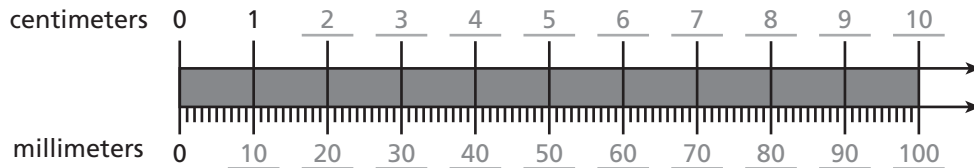
If you have any questions or comments, please call or write to me.

Sincerely,
Your child's teacher

Estimada familia,

En la clase de matemáticas estamos estudiando razones, tasas y porcentajes. Para que su hijo logre una mejor comprensión de esos conceptos y aprenda métodos de resolución de problemas, trabajaremos con tablas, diagramas y ecuaciones. Usted puede ayudar, pidiéndole a su hijo o hija que le explique cómo usar las tablas, los diagramas y las ecuaciones.

Aquí tiene algunos ejemplos de los tipos de problemas que resolveremos y de los tipos de tablas, diagramas y ecuaciones que usaremos.

- Para hacer jugo azul se necesitan 2 tazas de jugo de frambuesa por cada 3 tazas de jugo de arándanos. ¿Cuántas tazas de jugo de arándanos se necesitan si se usan 11 tazas de jugo de frambuesa?

Tabla con tasa por unidad **Ecuación**

A	F
3	2
$\frac{3}{2}$	1
$\frac{33}{2}$	11

$\div 2$ $\div 2$

$\bullet\, 11$ $\bullet\, 11$

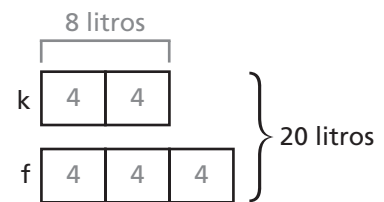$$\frac{2}{3} = \frac{11}{x}$$

$$2x = 33$$

$$x = \frac{33}{2}$$

La respuesta es $\frac{33}{2}$ o $16\frac{1}{2}$ tazas de jugo de arándanos.

- Una compañía hace jugo de kiwi con fresa mezclando 2 partes de jugo de kiwi con 3 partes de jugo de fresa. Para hacer 20 litros, ¿cuánto jugo de kiwi se necesita?
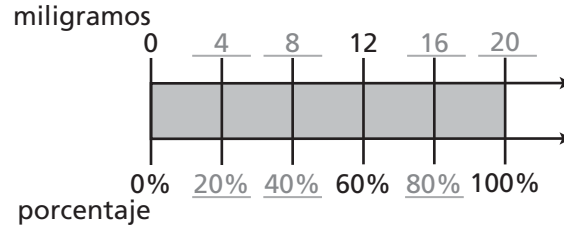
Rompecabezas de factores **Diagrama en forma de cinta**

	k	KF
	2	5
1	2	5
4	8	20

8 litros

k | 4 | 4 |

f | 4 | 4 | 4 |

20 litros

• Si 12 miligramos de niacina equivalen al 60% del consumo diario que se recomienda, entonces, ¿cuál es el consumo diario total de niacina que se recomienda?

Diagrama de recta numérica doble

miligramos

0   4   8   12   16   20

0%   20%   40%   60%   80%   100%

porcentaje

Ecuación

$$\frac{12}{x} = \frac{60}{100}$$
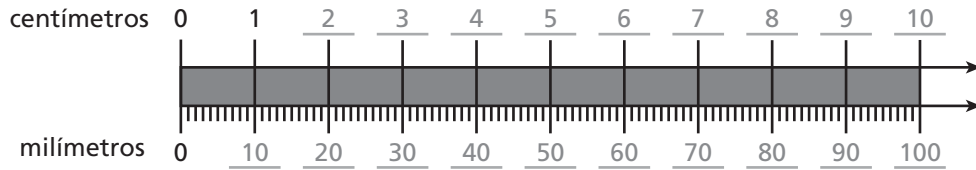
$$60x = 12 \bullet 100$$

$$x = \frac{12 \bullet 100}{60}$$

$$x = 20$$

La respuesta es 20 miligramos.

• Se puede usar una recta numérica doble para realizar conversiones entre centímetros y milímetros. Completen la recta numérica doble para mostrar cómo se relacionan los centímetros y los milímetros.

Diagrama de recta numérica doble

centímetros   0   1   2   3   4   5   6   7   8   9   10

milímetros   0   10   20   30   40   50   60   70   80   90   100

Si tiene comentarios o preguntas, por favor comuníquese conmigo.

Atentamente,
El maestro de su hijo

7-1
Class Activity

CA CC Content Standards **6.RP.1**, **6.RP.3**, **6.RP.3a**
Mathematical Practices **MP.4**, **MP.5**, **MP.6**, **MP.7**, **MP.8**

Vocabulary

compare ratios

▶ Compare Paint Ratios

Grasshopper Green paint has a blue:yellow paint ratio of 2:7.
Gorgeous Green paint has a blue:yellow ratio of 4:5.

You can **compare ratios**. You can find out which ratio makes
paint that is more blue and which ratio makes paint that is
more yellow.

To find out which paint is more blue, make the values for
yellow the same. One way to do this is to make the value for
yellow be the product of the yellow values in the basic ratios.

1. What is the product of the yellow values in the basic

   ratios? _____

2. Complete these ratio tables.

Grasshopper Green	
Blue	**Yellow**
2	7
	35

Gorgeous Green	
Blue	**Yellow**
4	5
	35

3. Which paint is more blue? Why?

   _____

   _____

   _____

4. Which paint is less blue? _____

5. To find out which paint is more yellow, make the values
   for blue the same. Complete these ratio tables.

Grasshopper Green	
Blue	**Yellow**
2	7

Gorgeous Green	
Blue	**Yellow**
4	5

6. Which paint is more yellow? _____
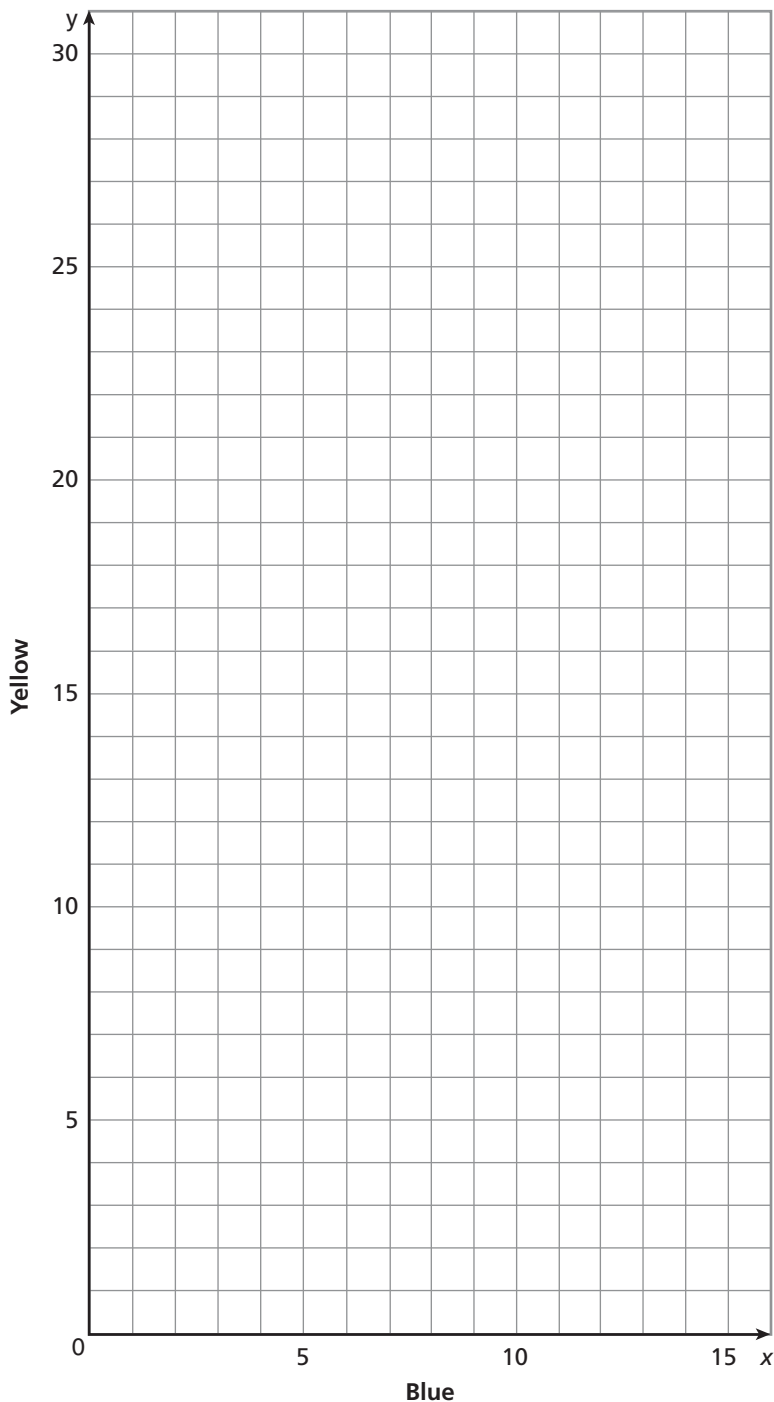
7. Which paint is less yellow? _____

▶ Graph and Compare Paint Ratios

8. Look back at the tables in Exercises 2 and 5 on page 271. Write the three ratios for each paint color in these tables.

Grasshopper Green	
Blue	**Yellow**

Gorgeous Green	
Blue	**Yellow**

9. Graph two points from each table. Draw and label a line for *Grasshopper Green* and a line for *Gorgeous Green*.

10. Discuss how the graphs can be used to decide which paint is more blue, less blue, more yellow, and less yellow.

CA CC Content Standards 6.RP.1, 6.RP.2, 6.RP.3, 6.RP.3a, 6.RP.3b, 6.EE.6 Mathematical Practices MP.1, MP.2, MP.3, MP.7, MP.8

▶ Ratio as a Quotient

You can use a unit rate to describe *any* ratio. A unit rate for a ratio tells the amount of the first attribute for 1 unit of the second attribute.

Look again at Sue's and Ben's drink recipes.
Sue's recipe has 5 cups cherry juice and 4 cups orange juice.
Ben's recipe has 6 cups cherry juice and 5 cups orange juice.

1. Find the amount of cherry juice in each drink for 1 cup of orange juice. Remember that when you divide both quantities in a ratio table by the same number, you get an equivalent ratio.

Sue's Recipe

Cherry : Orange

$\div 4$ (| 5 | 4 |) $\div 4$
| $\frac{5}{4}$ | 1 |

$\frac{5}{4}$ is the quotient of $5 \div 4$.

Sue has $\frac{5}{4}$ cups of cherry juice for every cup of orange juice.

The unit rate for the ratio 5:4 is $\frac{5}{4}$.

Ben's Recipe

Cherry : Orange

$\div 5$ (| 6 | 5 |) $\div 5$
| $\frac{6}{5}$ | 1 |

_____ is the quotient of $6 \div 5$.

Ben has _____ cups of cherry juice for every cup of orange juice.

The unit rate for the ratio _____ is _____.

2. Find the amount of orange juice in each drink for 1 cup of cherry juice. This time use the orange:cherry ratio.

Sue's Recipe

Orange : Cherry

| 4 | 5 |
| | 1 |

Ben's Recipe

| | |
| | |

Sue has _____ cup of orange juice for every cup of cherry juice.

The unit rate for the ratio _____ is _____.

Ben has _____ cup of orange juice for every cup of cherry juice.

The unit rate for the ratio _____ is _____.

► Use Unit Rate Language to Describe Ratios

Complete each sentence using a fraction.

3. Pedro uses a ratio of 7 quarts of blue paint to 4 quarts of white paint, a ratio of 7 to 4.

    a. Pedro uses _____ quarts of blue paint for every quart of white paint.

    b. The unit rate for the ratio 7:4 is _____ .

4. Grandpa's soup uses 3 cups of tomatoes to 8 cups of broth, a ratio of 3 to 8.

    a. Grandpa uses _____ cup of tomatoes for every cup of broth.

    b. The unit rate for the ratio 3:8 is _____ .

5. The unit rate for the ratio $a:b$ (b not equal to 0) is _____ .

► Compare Ratios Using Unit Rates

Look back at the unit rates you found on page 273 to answer these questions.

6. Whose drink is more cherry-flavored, Sue's or Ben's? How can you use unit rates to decide?

    _____

    _____

    _____

7. Whose drink is more orange-flavored, Sue's or Ben's? How can you use unit rates to decide?

    _____

    _____

    _____

▶ The Unit Rate Strategy

You can use the **unit rate strategy** to find the unknown in a proportion problem.

8. Maria's favorite juice recipe uses 4 cups of mango juice and 3 cups of strawberry juice. How many cups of strawberry juice should she mix with 5 cups of mango juice to make her favorite juice?

Answer: _____ cups

Since the unknown is the number of cups of *strawberry* juice, use the unit rate for the ratio *strawberry*:mango.

Strawberry : Mango

3	4
$\frac{3}{4}$	1
$\frac{15}{4}$	5

÷ 4   ÷ 4
• 5   • 5

9. Adelina makes 2 drawings in her sketchbook while Jayden makes 5 drawings in his sketchbook. If both continue at their same constant rates, how many drawings will Adelina have made when Jayden has made 7 drawings?
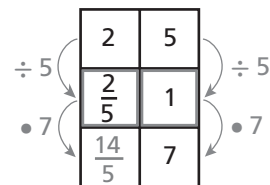
Answer: _____ drawings
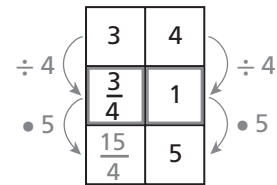
Since the unknown is the number of *Adelina's* drawings, use the unit rate for the ratio *Adelina*:Jayden.

Adelina : Jayden

2	5
$\frac{2}{5}$	1
$\frac{14}{5}$	7

÷ 5   ÷ 5
• 7   • 7

Solve. Use the unit rate strategy.

10. Diana can do 3 sit-ups in the time it takes Walter to do 2. How many sit-ups will Walter have done when Diana has done 12 sit-ups?

Answer: _____ sit-ups

11. Grandfather paid $6 for 14 apples. If I buy the same kind of apples, how much will 35 apples cost?

Answer: _____

▶ Variations on the Unit Rate Strategy

12. Gen, Claire, and Joey all use the unit rate strategy to solve this problem. But they record their thinking in different ways. Discuss how their methods are alike and how they are different.

> John can plant 7 tomato vines in the time it takes Joanna to plant 4 tomato vines. At that rate, when Joanna has planted 11 tomato vines, how many has John planted?

a. *Gen*: I use a ratio table. First I divide and then I multiply.

John : Joanna

b. *Claire*: I make a Factor Puzzle and put the unit rate on top.

John : Joanna

$11 \cdot \frac{7}{4}$

c. *Joey*: I "go through 1." I don't even write the unit rate.

John : Joanna

÷ 4 is 1
1 • 11 is 11

So I do the same for 7: $7 \div 4 \cdot 11$

$\frac{7}{4} \cdot 11 = \frac{77}{4}$

Answer: $\frac{77}{4}$ tomato vines

Solve using any variation of the unit rate strategy.

13. Shawn plants 6 tulip bulbs in the time it takes Martin to plant 7 tulip bulbs. How many tulip bulbs will Shawn have planted when Martin has planted 21 bulbs?

Answer: _____

14. Amanda buys 3 pounds of blueberries for $12. At the same price per pound, how much will 8 pounds of blueberries cost?

Answer: _____

▶ Horizontal Ratio Tables

1. Complete the ratio table.

Cups of Juice

Tangerine	◯		1	8		
Cherry	◯	1		6	15	2

   a. The basic ratio of $\frac{\text{tangerine}}{\text{cherry}}$ is _____ .

   b. There are _____ cups of tangerine juice for every cup of cherry juice.

   c. The basic ratio of $\frac{\text{cherry}}{\text{tangerine}}$ is _____ .

   d. There is _____ cup of cherry juice for every cup of tangerine juice.

2. A flower mix has 21 tulips and 14 daffodils.

   a. The basic ratio of $\frac{\text{tulips}}{\text{daffodils}}$ is _____ .

   b. There are _____ tulips for every daffodil.

   c. The basic ratio for $\frac{\text{daffodils}}{\text{tulips}}$ is _____ .

   d. There is _____ daffodil for each tulip.

   e. Using the basic ratio, how many tulips would be placed with 6 daffodils?

   _____

   f. Using the basic ratio, how many daffodils would be placed with 6 tulips?
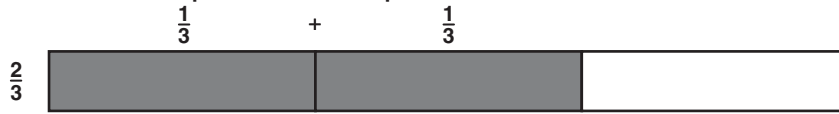
   _____

Solve.

3. At the farm the ratios of mothers to baby sheep in each field are equivalent. If there are 20 mothers and 24 babies in the small field, how many babies are with the 45 mothers in the large field?

_____

▶ Equivalent Fractions and Equivalent Ratios

4. Show how the pattern of equivalent fractions continues.

$\frac{2}{3}$

$\frac{1}{3}$ + $\frac{1}{3}$

$\frac{4}{6}$

$\frac{1}{6}$ + $\frac{1}{6}$ + $\frac{1}{6}$ + $\frac{1}{6}$
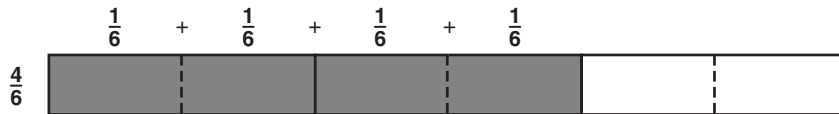
$$\frac{2 \cdot 2}{2 \cdot 3} = \frac{4}{6}$$
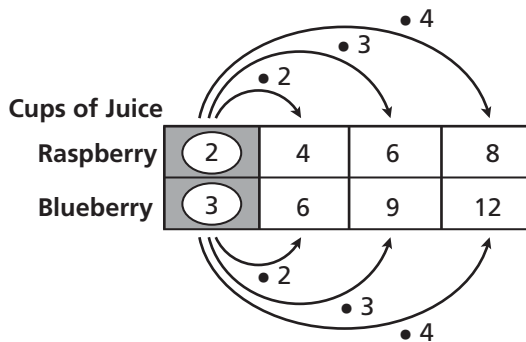
a. $\frac{6}{9}$

b. _____

c. $\frac{8}{12}$

d. _____

5. Show how the pattern of equivalent ratios continues.

Cups of Juice

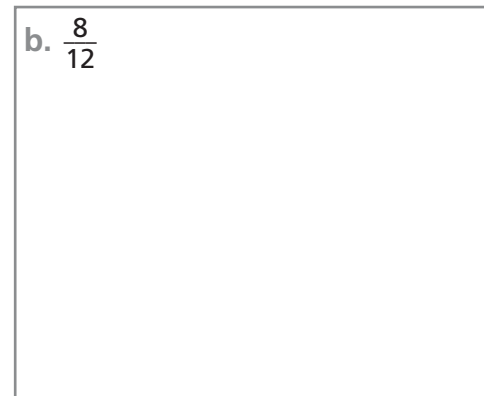| Raspberry	2	4	6	8
Blueberry	3	6	9	12

2 cups of raspberry:3 cups of blueberry

4 cups of raspberry:6 cups of blueberry

a. _____ cups of raspberry: _____ cups of blueberry

b. _____ cups of raspberry: _____ cups of blueberry

6. Draw to show the ratio pattern.

$\frac{2}{3}$ R R B B B

$\frac{4}{6}$ R R R R B B B B

a. $\frac{6}{9}$

b. $\frac{8}{12}$
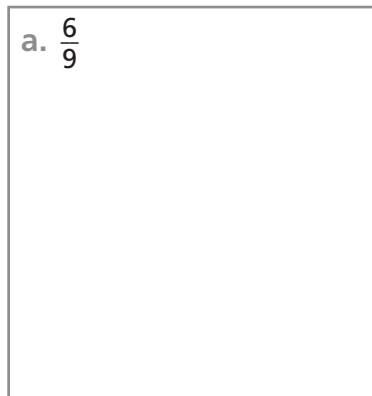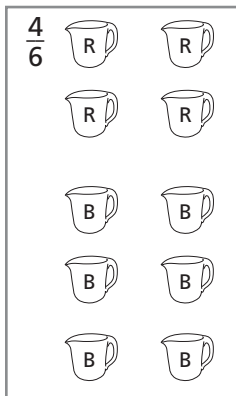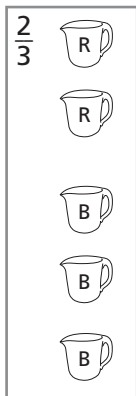
7. Discuss how equivalent fractions and equivalent ratios are alike and different.

CA CC Content Standards **6.RP.3**, **6.RP.3b**, **6.EE.6**, **6.EE.7** Mathematical Practices **MP.1**, **MP.3**, **MP.6**, **MP.7**

► Understanding Cross-Multiplication

When two equivalent ratios are written in a Factor Puzzle, the products of the numbers in opposite corners are equal. This results in a strategy for solving proportions called **cross-multiplication**.

$$\frac{10}{15} = \frac{18}{27}$$

| **Factor Puzzle** | **Multiply opposite corners. Products are equal.** | **Cross-multiply. Products are equal.** |

$$(2 \cdot 9)(3 \cdot 5) = (2 \cdot 5)(3 \cdot 9)$$

$$18 \cdot 15 = 10 \cdot 27$$

$$18 \cdot 15 = 10 \cdot 27$$

Cross-multiply to write an equation. Then, solve for the unknown.

1.

$18 \cdot 15 = 10q$

2. $\frac{8}{p} = \frac{14}{21}$

3. $\frac{10}{25} = \frac{t}{15}$

4. $\frac{s}{40} = \frac{10}{16}$

$q =$ _____ $p =$ _____ $t =$ _____ $s =$ _____

Write the ratios in each proportion in fraction form. Then, solve by using cross-multiplication.

5. $16{:}20 = 12{:}a$

6. $18{:}b = 27{:}33$

7. $6{:}15 = c{:}20$

8. $d{:}9 = 4{:}6$

$a =$ _____ $b =$ _____ $c =$ _____ $d =$ _____

▶ Cross-Multiplication and Unit Rates

9. Zander paid $7 for 5 avocados. How much would
9 avocados cost?

Discuss how these solution strategies relate to each other.

Rate Table	**Factor Puzzle**	**Cross-Multiplication**

Rate Table

$\div 5 \quad \bullet\, 9$

Dollars	7	$\frac{7}{5}$	$\frac{63}{5}$
Avocados	5	1	9

$\div 5 \quad \bullet\, 9$

Factor Puzzle

	5	9
Dollars $\frac{7}{5}$	7	$\frac{63}{5}$
Avocados 1	5	9

Cross-Multiplication

$$\frac{7}{5} \diagup\hspace{-1em}\diagdown \frac{c}{9}$$

$$c \bullet 5 = 7 \bullet 9$$

$$5c = 63$$

$$c = \frac{63}{5}$$

The price for 9 avocados is $\frac{63}{5}$ dollars, or $12.60.

▶ What's the Error?

Dear Math Students,

It took me 15 minutes to ride my bike 3 miles.
I wanted to find out how long it would take
me to ride 10 miles. My work can't be right
because my answer is only 2 minutes! What
did I do wrong?

Thank you.

Puzzled Penguin

$$\frac{15}{3} \diagup\hspace{-1em}\diagdown \frac{10}{t}$$

$$10 \bullet 3 = 15 \bullet t$$

$$30 = 15t$$

$$2 = t$$

10. Write a response to the Puzzled Penguin.

_____

_____

_____

_____

CA CC Content Standards **6.RP.1, 6.RP.3, 6.RP.3b, 6.EE.6, 6.EE.7** Mathematical Practices **MP.1, MP.3, MP.4, MP.6**

▶ Using Tape Diagrams to Model Ratios

A juice company's KiwiBerry juice is made by mixing 2 parts kiwifruit juice with 3 parts strawberry juice.
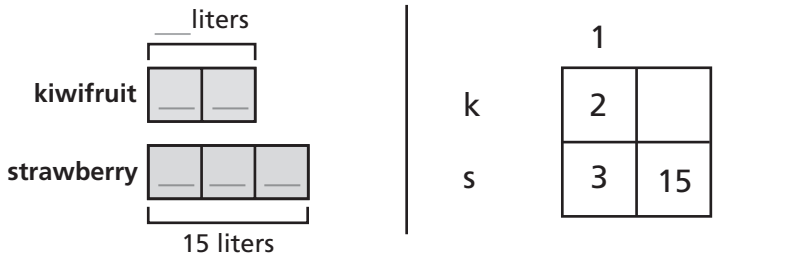
The ratio of parts of kiwifruit juice to parts of strawberry juice can be modeled by using a **tape diagram**.
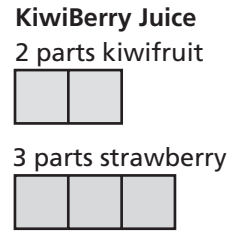
Solve each problem three ways: using the tape diagram, using a Factor Puzzle, and using cross-multiplication.

KiwiBerry Juice
2 parts kiwifruit

3 parts strawberry

1. How many liters of kiwifruit juice should be mixed with 15 liters of strawberry juice to make KiwiBerry juice?

_____ liters

___ liters

kiwifruit

strawberry

15 liters

	1	
k	2	
s	3	15

$\frac{2}{3} = \frac{x}{15}$

2. How many liters of strawberry juice should be mixed with 50 liters of kiwifruit juice to make KiwiBerry juice?

_____ liters

___ liters

kiwifruit

strawberry

___ liters

k		
s		
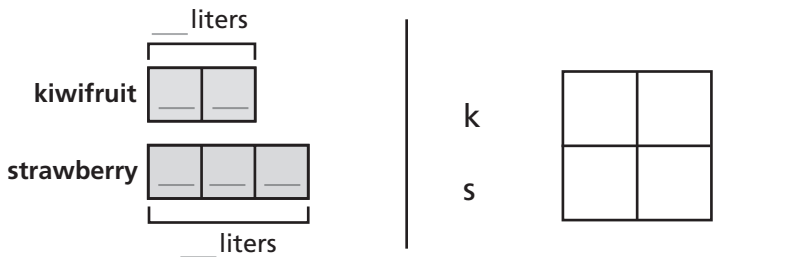
3. How many liters of kiwifruit juice should be mixed with 20 liters of strawberry juice to make KiwiBerry juice?

_____ liters

___ liters

kiwifruit

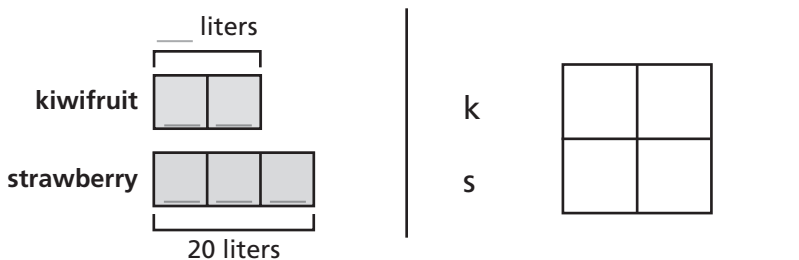strawberry

20 liters

k		
s		

► Using Tape Diagrams to Model Ratios (continued)

To make Perfect Purple paint, blue paint and red paint are mixed in a ratio of 3 to 5.

Solve each problem three ways: using a tape diagram, using a Factor Puzzle, and using cross-multiplication.

4. How many liters of red paint should be mixed with 21 liters of blue paint to make Perfect Purple paint?   _____ liters

5. How many liters of blue paint should be mixed with 23 liters of red paint to make Perfect Purple paint?   _____ liters

Choose a method to solve.

6. To make bricks, you can mix clay and sand in a ratio of 2 to 3. How much clay do you need to mix with 10 cubic yards of sand?   _____ cubic yards

▶ Part-to-Whole Ratios

Remember that KiwiBerry juice is made by mixing
2 parts kiwifruit juice with 3 parts strawberry juice.

We can solve problems involving the total amount
of juice or the total number of parts.

**Solve each problem three ways: using the tape diagram,
using a Factor Puzzle, and using cross-multiplication.**

7. How many liters of kiwifruit juice should be used
   to make 50 liters of KiwiBerry juice? _____ liters

$$\frac{2}{5} = \frac{x}{50}$$

8. How many liters of strawberry juice should be used
   to make 20 liters of KiwiBerry juice? _____ liters

9. If 7 liters of kiwifruit juice are used, how many liters
   of KiwiBerry juice can be made? _____ liters

► Part-to-Whole Ratios (continued)

To make Perfect Purple paint, blue paint and red paint are mixed in a ratio of 3 to 5.

Solve each problem three ways: using a tape diagram, using a Factor Puzzle, and using cross-multiplication.

10. How much red paint is needed to make 20 liters of Perfect Purple paint?

_____ liters

11. If 10 liters of blue paint are used, how many liters of Perfect Purple paint can be made?

_____ liters

Choose a method to solve.

12. To make bricks, you can mix clay and sand in a ratio of 2 to 3. To make 55 cubic feet of the mixture, how much sand do you need to use? How much clay do you need to use?

_____ cubic yards of clay

_____ cubic yards of sand

CA CC Content Standards **6.RP.1**, **6.RP.2**, **6.RP.3**, **6.RP.3b**, **6.EE.6**, **6.EE.7** Mathematical Practices **MP.1**, **MP.2**, **MP.3**, **MP.6**, **MP.7**

▶ Different Ways to Describe Ratios

Seth made a sand mixture by mixing 4 parts green sand with 3 parts yellow sand.
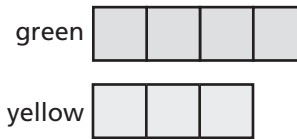
green
yellow

Complete each sentence to describe the green sand to yellow sand ratio.

1. The mixture is _____ parts green sand and

   _____ parts yellow sand.

2. Green sand and yellow sand are mixed in a ratio of

   _____ to _____ or _____ : _____.

3. For every _____ cups of green sand, there are

   _____ cups of yellow sand in the mixture.

Complete each sentence to describe the green sand to total ratio.

4. There are _____ parts green sand in _____ parts
   total mixture.

5. Green sand and total mixture are in a ratio of _____

   to _____ or _____ : _____.

6. For every _____ cups of green sand, there are

   _____ cups of mixture.

Describe the yellow sand to total ratio in three ways.

7. _____

8. _____

9. _____

▶ Different Portions Can Be One Whole

10. Complete each tape diagram.

Green sand is 1.	Yellow sand is 1.	Total sand is 1.
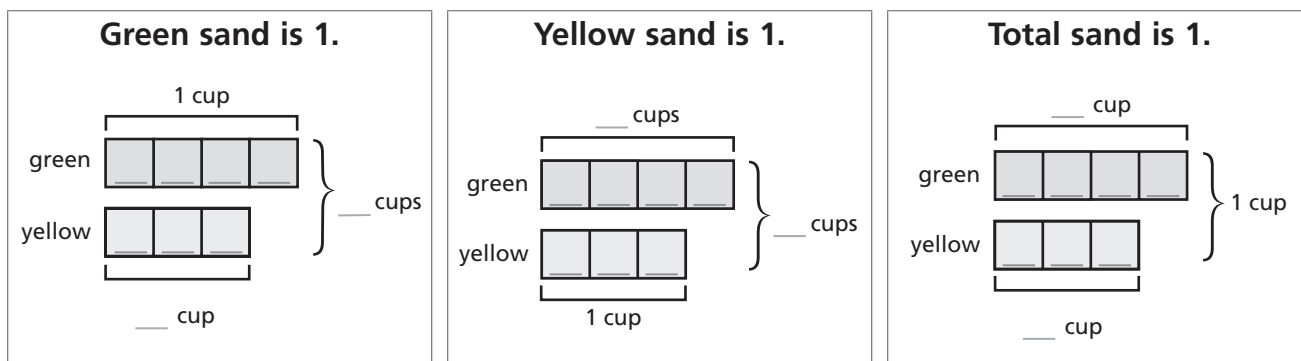
▶ Unit Rates

Write a fraction to complete each unit rate.

11. _____ cup of yellow sand for every 1 cup of green sand in the mixture

12. _____ cups of green sand for every 1 cup of yellow sand in the mixture

13. _____ cup of green sand and _____ cup of yellow sand for every 1 cup of mixture

14. _____ cups of mixture for every 1 cup of green sand

15. _____ cups of mixture for every 1 cup of yellow sand

▶ Multiplicative Comparisons

Write a fraction to complete each multiplicative comparison.

16. The amount of yellow sand is _____ times the amount of green sand.

17. The amount of green sand is _____ times the amount of yellow sand.

18. The total amount of mixture is _____ times the amount of green sand.

19. The total amount of mixture is _____ times the amount of yellow sand.

► What's the Error?

Dear Math Students,

I made my own sand mixture. I mixed 2 parts purple and 5 parts orange.

purple

orange

Then I wrote this multiplicative comparison.

- The amount of purple sand is $\frac{2}{5}$ times the amount of the total mixture.

My friend says that I made a mistake. Did I? If I did, can you tell me what mistake I made and help me correct it?

Your friend,

Puzzled Penguin

20. Write a response to Puzzled Penguin.

_____

_____

_____

_____

_____

_____

► Use Equations to Relate Quantities

21. Let g be the number of cups of green sand in Seth's ratio.
Let y be the number of cups of yellow sand in Seth's ratio.

g

green

yellow

y

$\frac{4}{3} = \frac{g}{y}$

$y = \frac{3}{4}g$

$\frac{4}{3}y = g$
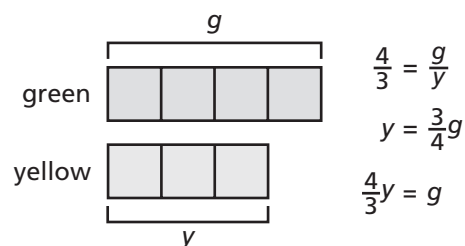
Discuss why these three equations can all be used to relate g and y.

▶ Blue-and-Red Mixtures

22. Make up your own blue-and-red sand mixture.
Your mixture should have a total of 5 parts. Draw
a tape diagram to show the ratio of blue to red.

23. Describe the ratio of blue sand to red sand in three ways.

_____

_____

_____

24. Describe the ratio of blue sand to the total mixture in three ways.

_____

_____

_____

25. Write two sentences that use a fraction to compare the
amounts of the two colors. Use the words *times as much*.

_____

_____

26. Suppose you make a large batch of your blue-and-red sand
mixture. Let b be the number of cups of blue sand that you
use, and let r be the number of cups of red sand that you use.
Write three equations relating b and r.

_____ _____ _____

27. How is your mixture different from a mixture with the
same colors mixed in a different ratio?

_____

_____

7–7
Class Activity

CA CC Content Standards **6.RP.1**, **6.RP.3**, **6.RP.3a**, **6.RP.3b** Mathematical Practices **MP.1**, **MP.3**, **MP.6**

▶ Practice Solving Rate and Ratio Problems

Solve. Use different methods including tables, Factor Puzzles, cross-multiplication, and tape diagrams. Look for the problems that cannot be solved with any of these!

Show your work.

1. In a lab, Chemical 1 and Chemical 2 are mixed in a ratio of 4 to 5. How much of Chemical 1 is needed to mix with 35 liters of Chemical 2?

   _____

2. In a lab, Chemical 1 and Chemical 2 are mixed in a ratio of 4 to 5. How much of each chemical is needed to make 35 liters of the mixture?

   Chemical 1: _____ Chemical 2: _____

3. Pokey the snail travels 25 centimeters every 2 minutes. How far will Pokey go in 15 minutes?

   _____

4. When Gary the snail travels at a steady rate of 15 centimeters per minute, it takes him 6 minutes to get from the pineapple to the rock. How long will it take Gary to get from the pineapple to the rock if he travels at a steady rate of 30 centimeters per minute?

   _____

5. At a factory, an assembly line produces 100 cans every 3 minutes. How long will it take the assembly line to produce 250 cans?

   _____

6. At a factory, an assembly line produces 100 cans every 3 minutes. How many cans will the factory produce in 8 hours?

   _____

▶ Practice Solving Rate and Ratio Problems (continued)

Show your work.

7. At a factory, each assembly line produces 100 cans every 3 minutes. If two assembly lines are working, how many cans will they produce in 15 minutes?

_____

8. It takes Brittany 2 hours to mow 5 acres of grass. At that rate, how long would it take Brittany to mow 8 acres?

_____

9. It takes Brittany 2 hours to mow 5 acres of grass. If Austin mows grass at the same rate as Brittany, how long will it take the two of them working together to mow 15 acres of grass?

_____

10. Jorge and Ryan are running laps around the track. Jorge runs 5 laps for every 4 laps that Ryan runs. When Ryan has run 15 laps, how many laps will Jorge have run?

_____

11. At a perfume factory, fragrance designers are mixing musk oil and spice cologne in different ratios. Mixture 1 is 2 parts musk oil to 5 parts spice cologne. Mixture 2 is 3 parts musk oil to 7 parts spice cologne. Which will have more of a spice fragrance? Explain.

_____

12. Fragrance designers make Roselily perfume by mixing rose and lily perfumes. In Roselily perfume, the amount of rose is $\frac{2}{5}$ times as much as the amount of lily. What is the ratio of rose to lily in Roselily? Draw a tape diagram to show the ratio.

_____

CA CC Content Standards **6.RP.3, 6.RP.3c**
Mathematical Practices **MP.1, MP.2, MP.3, MP.4,
MP.6, MP.8**

▶ Define Percent

Percent means "out of 100" or "for each 100." The symbol for percent is %.

> 37% is read "37 percent."
>
> It can mean the fraction $\frac{37}{100}$, the ratio 37:100, or the rate 37 *per* 100.

The fans at a sold-out concert are in 100 equal sections of seats. Each small rectangle in the diagram represents one section of fans.
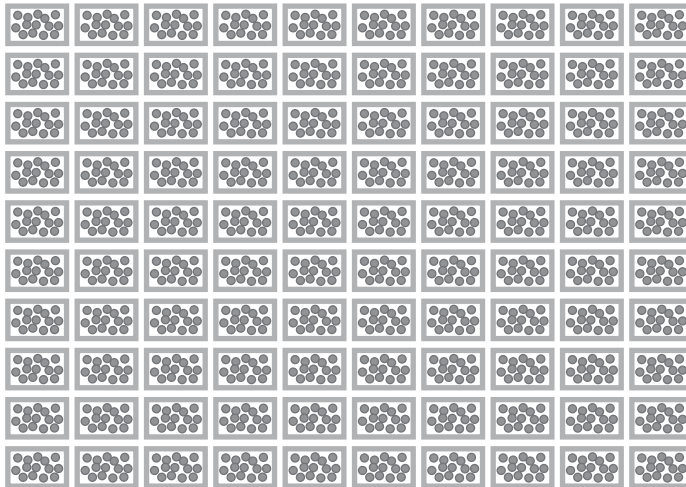
1. Color one section blue.

   What fraction of the fans is this?

   _____

   What percent of the fans is this?

   _____

2. Color three sections red.

   What fraction of the fans is this?

   _____

   What percent of the fans is this?

   _____

3. Color 23% of the sections green.

   What fraction of the fans is this?

   _____

4. Color 37% of the sections yellow.

   What fraction of the fans is that?

   _____

5. Shade some sections in purple. What percent did you shade?

   _____

▶ Percents of Bar Diagrams

The bars in Exercises 6–9 are divided into 100 equal parts.

6. Shade 5% of the bar.

7. Shade 15% of the bar.
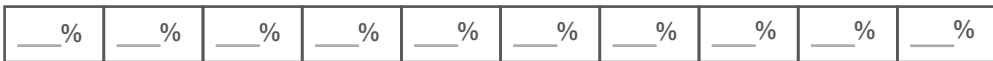
8. Shade 45% of the bar.

9. Shade 85% of the bar.

10. Label each section with the percent of the whole bar it represents. Under the section, write the fraction it represents.

Bar A

___%	___%

_____   _____

Bar B

___%	___%	___%	___%	___%	___%	___%	___%	___%	___%

_____ _____ _____ _____ _____ _____ _____ _____ _____ _____

Bar C

___%	___%	___%	___%	___%

_____   _____   _____   _____   _____

Bar D

___%	___%	___%	___%

_____   _____   _____   _____
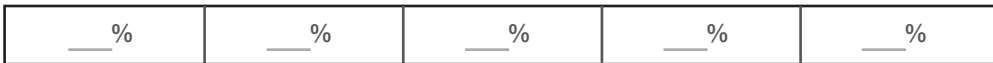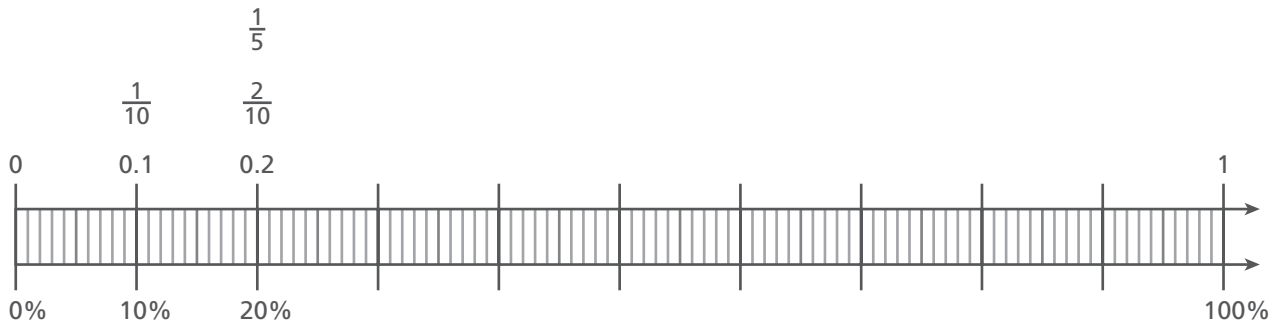
11. Shade 70% of Bar B.   12. Shade 60% of Bar C.   13. Shade 75% of Bar D.

► Relating Percents, Decimals, and Fractions

14. Label each long tick mark with a decimal, a percent, and a fraction with a denominator of 10. If the fraction can be simplified, write the simplified form as well.

15. Write each percent as a fraction with denominator 100 and as a decimal. Then place the percents and decimals on the number lines.

Percent	83%	51%	46%	6%	60%	27%	127%	3%	30%	130%
Fraction	$\frac{83}{100}$						$\frac{127}{100}$			
Decimal	0.83						1.27			
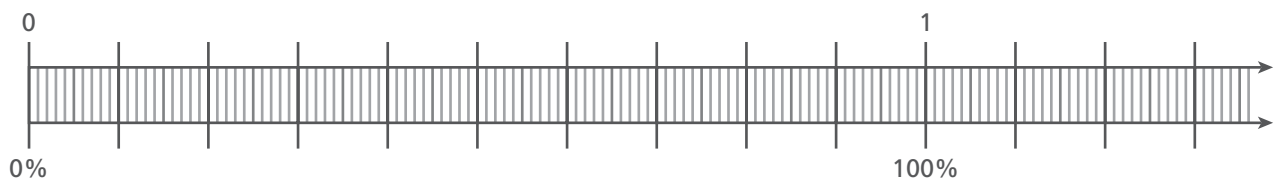
▶ What's the Error?

Dear Math Students,

I said that 7% is 0.7, but my friend said that I am not right. Why not? Please help me understand how percents and decimals are related.

Thank you.

Puzzled Penguin

16. Write a response to Puzzled Penguin.
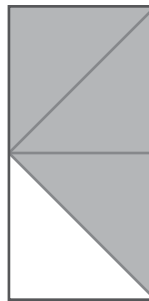
_____

_____

▶ Percents and Area

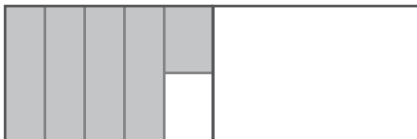**What percent of the figure is shaded?**

17. _____
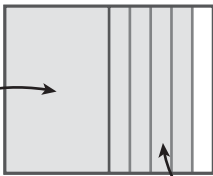
Katie's reasoning:
This part is half, so it is 50%.
These 5 parts make 50%.
So, they are 10% each.

18. _____

19. _____

20. _____

The Meaning of Percent

CA CC Content Standards **6.RP.3, 6.RP.3c, 6.EE.6, 6.EE.7** Mathematical Practices **MP.1, MP.3, MP.4, MP.6**
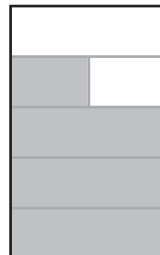
▶ Model Finding a Percent of a Number

The 300 students at a school are in 100 groups of 3.

1. Color one group blue.

   What percent of the students is this?

   _____

   What number of students is this?

   _____

2. Color four groups red.

   What percent of the students is this?

   _____

   What number of students is this?

   _____

3. Color 17 groups green.

   What percent of the students is this?

   _____

   What number of students is this?

   _____

4. Color 9% of the students yellow.

   What number of students is this?

   _____

5. Color 24% of students orange.

   What number of students is this?

   _____

6. Color 35% of the students purple.

   What number of students is this?

   _____

► Find a Percent of a Number

Three students had different ideas about how to solve the following problem.

Of the 300 students at a school, 35% say they are going on a field trip. How many students are going on the field trip?

Use each idea to solve the problem.

Show your work.

7. **Anna's idea:** I will divide 300 by 100 to find 1% of 300. Then, I will multiply that answer by 35 to find 35% of 300.

_____

8. **Rantavious's idea:** I will use the fact that 35% of 300 means $\frac{35}{100}$ times 300.
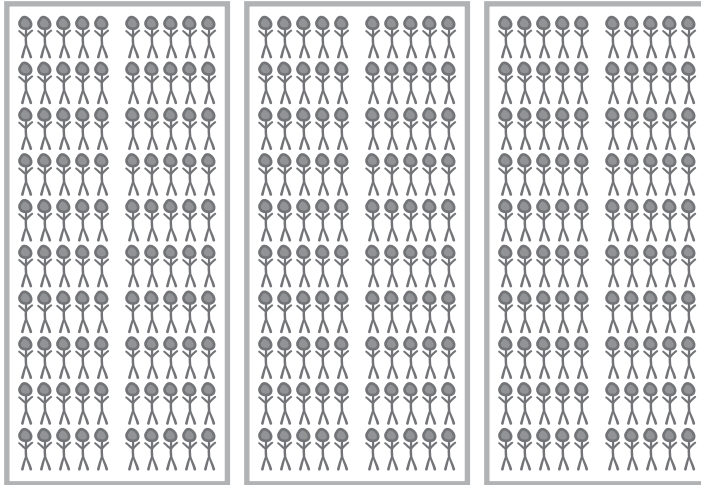
_____

9. **Jon's idea:** If f is the number of students going on the trip, then the fraction of students going is $\frac{f}{300}$, and it is also $\frac{35}{100}$. I can write and solve a proportion.

_____

10. What is 80% of 300 students? Solve in two ways.

_____

11. What is 26% of 1,200 students? Solve in two ways.

_____

▶ Percent as a Ratio

Now the students at the school are in 3 groups of 100.

12. Circle one student from each group in blue.

What percent of the students is this?

_____

What number of students is this?

_____

13. Circle four students from each group in red.

What percent of the students is this?

_____

What number of students is this?

_____

14. Circle 45% of the students in green.

How many students is this? Why?

_____

_____

15. Circle 82% of the students in yellow.

How many students is that? Why?

_____

_____

▶ Methods for Finding a Percent of a Number

Five students had different ideas about how to solve the problem below.

> Of the 300 students at a school, 99% say they are going to the school party. How many students is this?

Use each idea to solve the problem.

Show your work.

16. Hilda's idea: 99% means 99 for each 100. So, I will use a 99% ratio table.

_____

99% ratio table

portion	99		
whole	100	200	300

17. Anna's idea: I will divide 300 by 100 to find 1% of 300. Then, I will multiply that answer by 99 to find 99% of 300.

_____

18. Rantavious's idea: I will use the fact that 99% of 300 means $\frac{99}{100}$ times 300.

_____

19. Jon's idea: If p is the number of students going to the party, then the fraction of students going is $\frac{p}{300}$, and it is also $\frac{99}{100}$. I can write and solve a proportion.

_____

20. Gregory's idea: 99% is 100% minus 1%, so I will take 1% of the 300 students away from 100% of 300.

_____

Solve.

21. What is 51% of 600 students?

_____

22. What is 49% of 500 students?

_____

CA CC Content Standards **6.RP.3, 6.RP.3c, 6.EE.6, 6.EE.7**
Mathematical Practices **MP.1, MP.2, MP.3, MP.4, MP.8**

▶ Percents of Numbers

The adult dose of a medicine is 8 milliliters. The child dose is 75% of the adult dose. How many milliliters is the child dose?

1. Complete the double number line to help you solve this problem.

milliliters 0 _____ _____ _____ 8

percent 0% _____ _____ _____ 100%

2. Discuss and complete these solutions.

Trey's Reasoning About Parts	**Quowanna's Factor Puzzle**
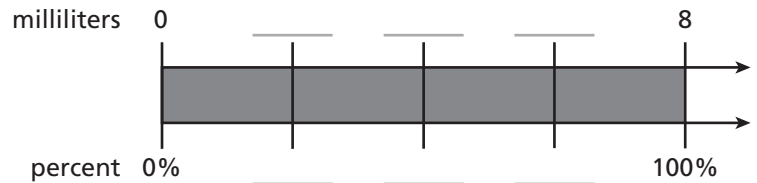
Trey's Reasoning About Parts

100% is 4 parts, which is 8 mL.

25% is 1 part, which is 8 mL ÷ 4 = 2 mL.

75% is 3 parts and is _____.

Quowanna's Factor Puzzle

percent   milliliters

	25	
portion	75	
whole	100	8

Tomaslav's Equation

m is 75% of 8.

$m = \frac{75}{100} \cdot 8 = $ _____

Jessica's Proportion

percent   milliliters

portion $\frac{75}{100}$ = $\frac{m}{8}$
whole

$\frac{3}{4}$ = $\frac{m}{8}$

m = _____

Solve in two ways.

3. The adult dose of a medicine is 6 milliliters. The child dose is 75% of the adult dose. How many milliliters is the child dose?
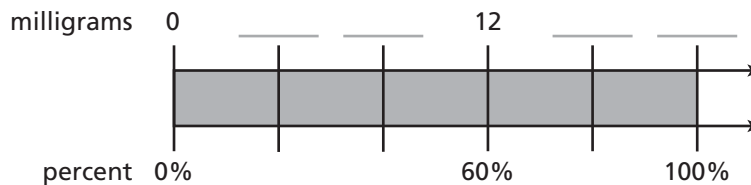
_____

4. A chemist needs 20% of the 120 milliliters of solution in a beaker. How many milliliters of solution does the chemist need?

_____

▶ Find the Whole from the Percent and the Part

If 12 milligrams is 60% of the recommended daily allowance for niacin, then what is the recommended daily allowance for niacin?

5. Complete the double number line to help you solve this problem.

milligrams 0 _____ _____ 12 _____ _____

6. Discuss and complete these solutions.

percent 0% _____ _____ 60% _____ 100%

Trey's Reasoning about Parts	Quowanna's Factor Puzzle
60% is 3 parts and is 12 mg.	percent milliliters
20% is 1 part, which is 12 mg ÷ 3 = 4 mg.	portion $\boxed{\begin{array}{c|c} 60 & 12 \end{array}}$
100% is 5 parts, which is _____.	whole $\boxed{100 \quad}$

Tomaslav's Equation	Jessica's Proportion
60% of g is 12.	percent milliliters
$\frac{60}{100} \cdot g = 12$	portion $\frac{60}{100} = \frac{12}{g}$ milliliters whole

Solve.

7. A chemist poured 12 mL of chemicals into water to make a solution. The chemicals make up 80% of the solution. How many milliliters is the full solution?

_____

8. What is 40% of 70? _____

9. 40% of what number is 70? _____

10. 30% of what number is 120? _____

11. What is 30% of 120? _____

12. If 75% of the recommended daily allowance of vitamin C is 45 mg, what is the recommended daily allowance of vitamin C?

_____

CA CC Content Standards **6.RP.3, 6.RP.3c, 6.EE.6, 6.EE.7** Mathematical Practices **MP.1, MP.6, MP.8**

► Use Percents to Compare

Using percents can help you compare two groups when the sizes of the groups are different.

Appling School has 300 students and 45 students ride a bus to and from school each day. Baldwin School has 500 students and 55 students ride a bus.

1. Discuss and complete these methods for calculating the percent of students at Appling School who ride a bus.

Alex's Equation	**Jordan's Equation**
$f\%$ is $\frac{45}{300}$.	$f\%$ of 300 is 45.
$\frac{f}{100} = \frac{45}{300}$	$\frac{f}{100} \cdot 300 = 45$

Aliya's Factor Puzzle

percent   students

	percent	students
portion		45
whole	100	300

Rachel's Idea of Going through 1%

300 students is 100%.

$300 \div 100 = 3$; 3 students is 1%.

$45 \div 3 = 15$; 45 students is 15 groups of 3 students,

which is _____%.

2. Use two methods to calculate the percent of students at Baldwin School who ride a bus.

▶ Mixed Percent Problems

3. 26 is what percent of 130? _____   4. 25% of what number is 225? _____

5. What is 75% of 280? _____   6. 70% of what number is 595? _____

Solve.   *Show your work.*

7. A company spent $4,500 of its $18,000 advertising budget on Internet ads. What percent of its advertising budget did the company spend on Internet ads?

_____

8. If 30% of a company's advertising budget is $7,200, then what is the full advertising budget?

_____

9. Another company's advertising budget is $7,200. The company spent 30% of their budget on newspaper ads. How much did the company spend on newspaper ads?

_____

10. If a gasoline-ethanol mixture made with 24 liters of ethanol is 15% ethanol, then how many liters is the whole mixture?

_____

11. If 3 gallons of antifreeze is mixed with 2 gallons of water, what percent of the mixture is antifreeze?

_____

What percent of the mixture is water?

_____

12. If a pharmacist needs to mix 800 mL of antibiotic with water so that the mixture is 40% antibiotic, then how much water does the pharmacist need to add?

_____

CA CC Content Standards **6.RP.3, 6.RP.3d, 6.EE.6, 6.EE.7, 6.G.1, 6.G.4** Mathematical Practices **MP.1, MP.3, MP.4, MP.6, MP.8**

▶ Convert Between Centimeters and Millimeters

1. Label the double number line to show how centimeters (cm) and millimeters (mm) are related.
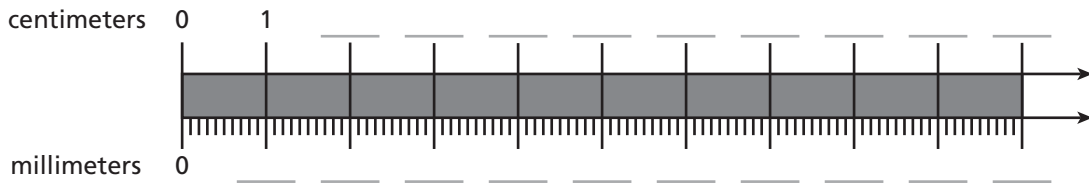
We can write two unit rates comparing centimeters to millimeters.

There are 10 millimeters per centimeter.	There is $\frac{1}{10}$ centimeter per millimeter.
We can write this unit rate as $10 \frac{mm}{cm}$.	We can write this unit rate as $\frac{1}{10} \frac{cm}{mm}$.

Unit rates are helpful for converting measurements from one unit to another.

2. Compare these methods of converting 52 centimeters to millimeters.

Write and Solve a Proportion

$$\frac{1 \text{ cm}}{10 \text{ mm}} = \frac{52 \text{ cm}}{x \text{ mm}}$$

$$52 \cdot 10 = 1 \cdot x$$

$$520 = x$$

So, 52 cm = 520 mm.

Use a Unit Rate

$$52 \text{ cm} \cdot 10 \frac{mm}{cm} = 520 \text{ mm}$$

There are 52 cm, and there are 10 mm in each cm.

The unit cm cancels, leaving the unit mm.

3. Complete these methods for converting 85 millimeters to centimeters.

Write and Solve a Proportion

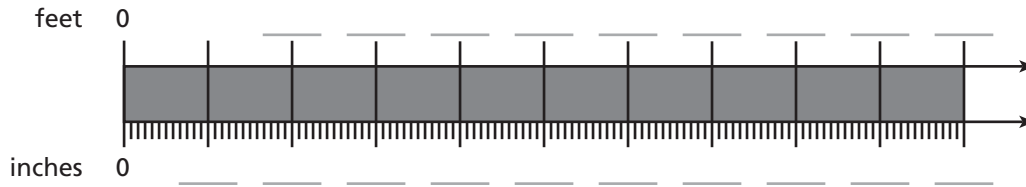$$\frac{1 \text{ cm}}{10 \text{ mm}} = \frac{x \text{ cm}}{85 \text{ mm}}$$

Use a Unit Rate

$$85 \text{ mm} \cdot \frac{1}{10} \frac{cm}{mm} = \underline{\hspace{1cm}} \text{ cm}$$

There are 85 mm, and there is $\frac{1}{10}$ cm in each mm.

So, 85 mm = _____ cm.

► Convert Between Feet and Inches

4. Label the double number line to show how feet and inches are related.

feet   0

inches   0

5. What are the two unit rates in this situation?

_____ $\frac{\text{in.}}{\text{ft}}$ and _____ $\frac{\text{ft}}{\text{in.}}$

6. Convert 132 inches to feet by multiplying by a unit rate. Show your work.

132 in. = _____ ft

7. Convert $6\frac{1}{2}$ feet to inches by multiplying by a unit rate. Show your work.

$6\frac{1}{2}$ ft = _____ in.

► Practice Converting Units of Length

8. What two unit rates relate centimeters (cm) and meters (m)?

_____

9. Convert 7.9 meters to centimeters using any method.

7.9 m = _____ cm

10. Convert 42 centimeters to meters using any method.

42 cm = _____ m

11. What two unit rates relate feet (ft) and yards (yd)?

_____

12. Convert 16 feet to yards using any method.

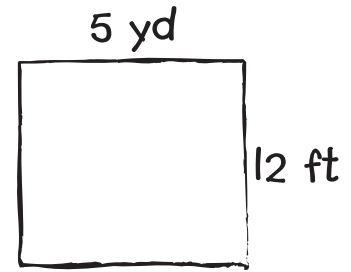16 ft = _____ yd

13. Convert 24 yards to feet using any method.

24 yd = _____ ft

▶ Find Area When Units Are Different

Riley and Kelsey wanted to find the area of their rectangular bedroom. Riley measured the length and Kelsey measured the width. They made the sketch at the right to show their measurements.

5 yd

12 ft

Below are the girls' area calculations.

Riley's Calculation	**Kelsey's Calculation**
I want to find the area in square yards, so I have to change 12 feet to yards.	I want to find the area in square feet, so I have to change 5 yards to feet.
$12 \text{ ft} \cdot \frac{1}{3} \frac{\text{yd}}{\text{ft}} = 4 \text{ yd}$	$5 \text{ yd} \cdot 3 \frac{\text{ft}}{\text{yd}} = 15 \text{ ft}$
Now, I can use the area formula.	Now, I can use the area formula.
$A = lw = 4 \text{ yd} \cdot 5 \text{ yd} = 20 \text{ yd}^2$	$A = lw = 15 \text{ ft} \cdot 12 \text{ ft} = 180 \text{ ft}^2$

14. Discuss Riley and Kelsey's calculations.

15. Explain how the diagram at the right shows that $1 \text{ yd}^2 = 9 \text{ ft}^2$.

1 yd

1 yd

1 ft
1 ft
1 ft

1 ft   1 ft   1 ft

_____

_____

_____
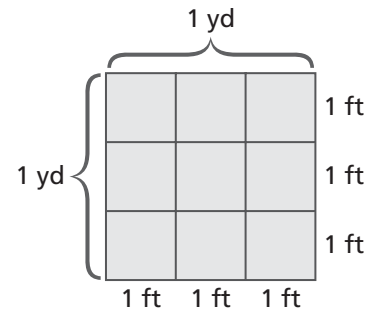
16. Write two unit rates relating square yards and square feet.

_____ $\frac{\text{ft}^2}{\text{yd}^2}$ and _____ $\frac{\text{yd}^2}{\text{ft}^2}$

17. Use one of the unit rates from Exercise 16 to convert Riley's area of 20 yd² to square feet. Does the answer agree with the area Kelsey got?
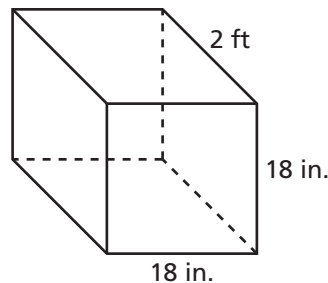
$20 \text{ yd}^2 =$ _____

▶ Practice Solving Area Problems

Solve. *Show your work.*

18. A rectangle has a base length of 3 meters and a height of 15 decimeters. Find the area of the rectangle. Be sure to specify the unit in your answer.

_____

19. Find the surface area of the rectangular prism at the right. Be sure to specify the unit in your answer.

_____

2 ft

18 in.

18 in.

▶ What's the Error?

Dear Math Students,
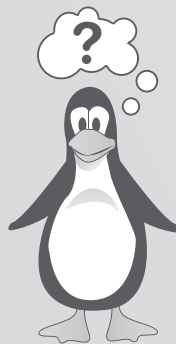
The school nurse said that I am 42 inches tall. I wanted to figure out how many feet this is. Here's what I did:

$42 \text{ in.} \cdot 12 \frac{\text{in.}}{\text{ft}} = 504 \text{ ft}$

I know I am not 504 feet tall! Please help me figure out what I did wrong and help me find my real height in feet.

Thank you.

Puzzled Penguin

20. Write a response to Puzzled Penguin.

_____

_____

_____

_____

CA CC Content Standards **6.RP.3, 6.RP.3d, 6.EE.6, 6.EE.7** Mathematical Practices **MP.3, MP.6**

▶ Converting Metric Units of Liquid Volume

The most common metric units of **liquid volume**, or capacity, are milliliters and liters.

1. Label the double number line to show how liters (L) and milliliters (mL) are related.

milliliters 0   1,000 ____ ____ ____ ____ ____ ____
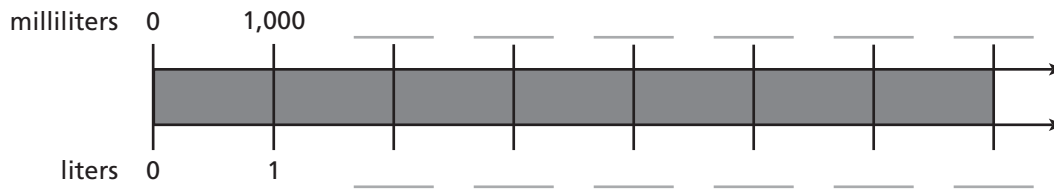
liters 0   1 ____ ____ ____ ____ ____

2. What two unit rates relate liters and milliliters?

_____

3. A can holds 344 mL of seltzer. How many liters is this? Find your answer in two ways: by writing and solving a proportion and by using a unit rate.

Write and Solve a Proportion	**Use a Unit Rate**

344 mL = _____ L

Solve using any method.

4. A bottle contains 1.89 liters of water. How many milliliters is this?

_____

5. A soap dispenser holds 220 mL of soap. A refill bottle of soap contains 1.76 L. How many times can the dispenser be refilled from the bottle?

_____

► Converting Customary Units of Liquid Volume

Units of liquid volume, or capacity, in the customary system include cups, pints, quarts, and gallons.

Customary Units of Liquid Volume
2 cups = 1 pint
2 pints = 1 quart
4 quarts = 1 gallon

6. Write two unit rates relating quarts (qt) and gallons (gal).

7. How many quarts would it take to fill a $2\frac{3}{4}$-gallon punch bowl?

8. One of the cows on Tessa's farm produces an average of 22 quarts of milk each day. How many gallons is this?

9. How many pints are in 1 gallon?

10. Use your answer to Question 9 to help you write two unit rates relating pints (pt) and gallons (gal).

11. The school cafeteria sells 300 half-pint cartons of milk every day. How many gallons of milk is this?

12. Which is more, 72 cups or 20 quarts? Explain how you found your answer.

► Converting Units of Mass

The most common units of mass are grams (g) and kilograms (kg).

13. Complete.

1 kg = _____ g   1 g = _____ kg

14. Write two unit rates relating grams and kilograms.

_____

15. Convert 3,575 grams to kg.

3,575 g = _____ kg

16. Convert 3,575 kg to grams.

3,575 kg = _____ g

17. A nickel has a mass of 5 g. A bag contains 2 kg of nickels. How many nickels are in the bag? Explain.

_____

_____

► Converting Units of Weight

The most common units of weight are ounces (oz) and pounds (lb).

18. There are 16 ounces in 1 pound. Write two unit rates relating ounces and pounds.

_____

19. Convert 420 pounds to ounces.

420 lb = _____ oz

20. Convert 420 ounces to pounds.

420 oz = _____ lb

21. Donelle adopted two puppies. Daisy weighs $7\frac{1}{2}$ pounds. Bandit weighs 108 ounces. Which puppy weighs more? Explain.

_____

_____

▶ **Conversion Word Problems**

Solve.   *Show your work.*

22. A box of FruitBlaster cereal contains 450 g of cereal.

   a. How many kilograms of cereal will the company
   need to fill 15,000 boxes?

   _____

   b. How many boxes of FruitBlaster cereal can the
   company fill with 15,000 kg of cereal?

   _____

23. A perfume bottle holds 5 mL. The perfume company
wants to fill 25,000 bottles. How many liters of
perfume will the company need?

_____

24. A restaurant has a viewing aquarium that holds
70 gallons of water. How many cups is that amount
of water equivalent to?

_____

25. There are 75 sixth grade students at Wilson Middle
School. Each student has a science book that is 5 cm
thick. If all the sixth graders stacked their science books
on top of each other, would the stack be as tall as the
4-meter-tall school building? Explain.

_____

_____

_____

_____

CA CC Content Standards **6.RP.1, 6.RP.3c**
Mathematical Practices **MP.1, MP.2, MP.3, MP.6**

▶ Math and Collections

The **bar graph** and the **circle graph** show data about Sahil's postcard collection.

Bar Graph
Sahil's Postcards from the U.S. by Region

Circle Graph
Sahil's Postcards from the U.S. by Region
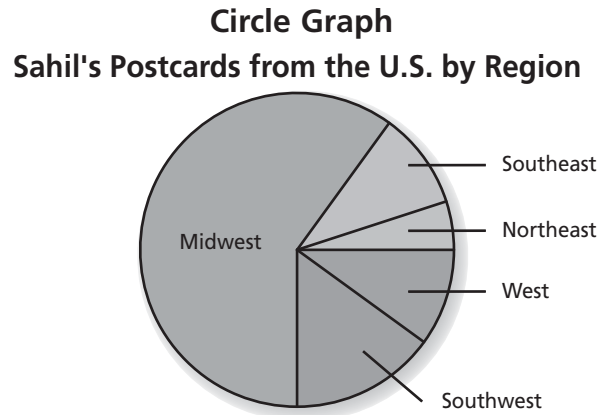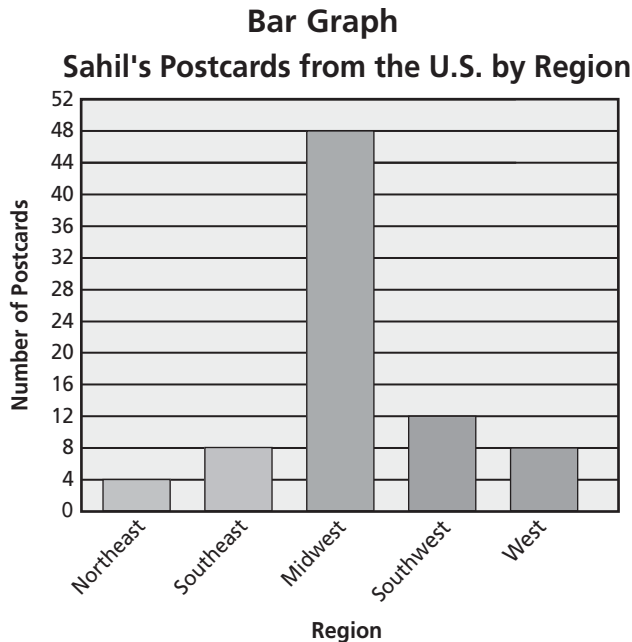
Solve. Use the bar graph.

1. What is the ratio of cards from the Northeast to cards from the West? _____

2. What is the ratio of cards from the West to cards from the Northeast? _____

Solve. Use the circle graph.

3. Are more or fewer than 50% of Sahil's cards from the Midwest? _____

4. Are more or fewer than 25% of Sahil's cards from the Southwest? _____

5. How could you check your answers to Problems 3 and 4 by using the bar graph?
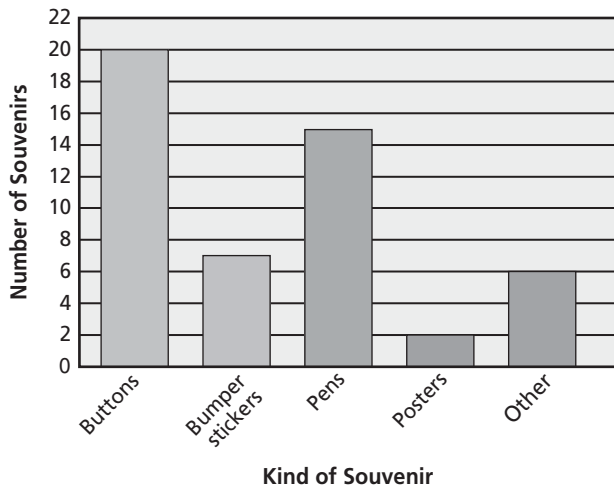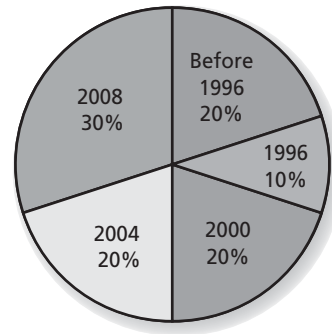
St. Louis

Florida

The Grand Canyon

► Choose Graphs to Solve

Isabel has a collection of souvenirs from U.S. presidential elections. The graphs below show the kinds of souvenirs she has collected and the dates of the presidential elections for her souvenirs.

Isabel's Presidential Election Souvenirs

Presidential Elections of Isabel's Souvenirs

Solve. For Problems 6–8, write whether you used the bar graph, the circle graph, or both.

6. What percent of Isabel's souvenirs are buttons?

   _____   _____

7. What percent of Isabel's souvenirs are from elections in 2000 or later?

   _____   _____

8. How many of her souvenirs are from the 2008 election?

   _____   _____

9. Hector says that the graphs make it clear that 6 of the buttons must be from the 2008 election. Do you agree? Explain.

   _____

   _____

   _____

   _____

Focus on Mathematical Practices

1. Dotti's potato salad uses 5 large potatoes and 2 eggs.
   Choose True or False for each statement.

   1a. The salad uses potatoes and eggs in a ratio of 5:2.

   ○ True   ○ False

   1b. The salad uses 2 potatoes for every 5 eggs.

   ○ True   ○ False

   1c. The salad uses $\frac{5}{2}$ potatoes for each egg.

   ○ True   ○ False

2. How are comparing two fractions and comparing two ratios alike?
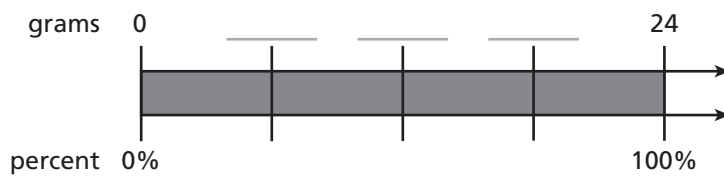   How are they different?

   Alike:

   Different:

3. The double line graph shows that 100% of a quantity has a
   mass of 24 grams.

   Part A
   Complete the double number line
   and explain your method.

   grams   0 ____ ____ ____ 24

   percent 0% ____ ____ ____ 100%

   Part B
   Explain how you can use the double
   number line to find 75% of 24 grams.

4. Fill in the bubble next to the measure that makes the sentence true.

There are 4 quarts in 1 gallon, so there are _____ gallons in 1 quart.

○ $\frac{1}{4}$ ○ 0.4   ○ $\frac{4}{1}$

5. Select Yes or No to indicate if the expression is equivalent to the ratio 3:2.

5a. $\frac{3}{2}$ ○ Yes   ○ No

5b. 6:3   ○ Yes   ○ No

5c. $\frac{9}{4}$ ○ Yes   ○ No

5d. 12:8   ○ Yes   ○ No

5e. $\frac{2}{3}$ ○ Yes   ○ No

6. There are 420 pumpkins in Jennifer's pumpkin patch. She picked 15% of them. How many pumpkins did Jennifer pick?

Ⓐ 15 pumpkins

Ⓑ 28 pumpkins

Ⓒ 42 pumpkins

Ⓓ 63 pumpkins

7. Carly buys 4 pounds of strawberries for $9.00. What is the unit cost of the strawberries?

_____ per pound

Choose numbers from the number tiles to write two fractions that will make the statement true. You may write a number more than once.

| 4 | 5 | 9 |

8. A paint mixture is 4 parts red and 5 parts white. For every 1 gallon of

paint, _____ gallon is red and _____ gallon is white.

Solve each proportion. Show your work.

9. $4{:}x = 3{:}5$

$x =$ _____

10. $\frac{1}{7} = \frac{b}{18}$

$b =$ _____

11. 14 is what percent of 56? _____

12. 25% of what number is 35? _____

13. Which distance is equivalent to 8 meters? Select all that apply.

(A) 80 cm

(C) 0.08 km

(B) 800 cm

(D) 0.008 km

14. Convert 8,900 mL to L.

_____

15. Orange and pineapple juice are mixed in a ratio of 4 to 5. Choose one number from each column to show the amount of each juice that is needed to make 36 gallons of orange-pineapple juice.

orange	pineapple
○ 12 gal	○ 16 gal
○ 16 gal	○ 18 gal
○ 18 gal	○ 20 gal
○ 20 gal	○ 24 gal

16. Savitri buys 3 pounds of sliced turkey for $12. At that rate, how much sliced turkey can she buy for $25? Show your work.

_____ pounds

17. If 35% of a company's advertising budget is $7,000, what is the full advertising budget? Show your work.

$ _____

18. A rectangle has a base of 4 feet and a height of 18 inches. The area of the rectangle is:

(A) 34 square inches.

(C) 6 square feet

(B) 72 square inches

(D) 4.5 square feet.

19. An empty bottle of olive oil has a capacity of 750 mL. How many empty bottles could be filled with 4.5 L of olive oil? Show your work.

_____ bottles

20. In a lab, Chemical A and Chemical B are mixed in a ratio of 2 to 3.

Part A

How much of Chemical B is needed to mix with 18 liters of Chemical A? Explain your answer.

_____ liters

Part B

What percent of the mixture is Chemical A? Explain your answer.

_____ %

Part C

If the ratio of Chemical A to Chemical B was 4 to 5, would Chemical A be a greater or a lesser percent of the mixture? Explain your answer.

21. On Friday, Pizza Place sold a total of 120 pizzas.

Part A

30% of the pizzas sold were plain cheese pizzas. How many plain cheese pizzas were sold? Show or explain how you got your answer.

_____ plain cheese pizzas were sold

Part B

Thirty of the pizzas sold were vegetarian pizzas. What percent of the pizzas sold were vegetarian pizzas? Show or explain how you got your answer.

_____ %

Part C

On Saturday, Pizza Place again sold 30 vegetarian pizzas, which was 10% of the total number of pizzas sold on that day. What was the total number of pizzas sold on Saturday? Show or explain how you got your answer.
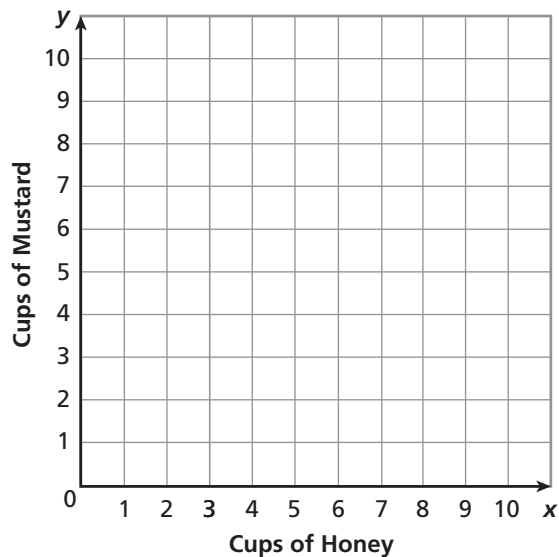
_____ pizzas sold on Saturday

22. Arun's honey-mustard sauce has 3 cups honey and 4 cups mustard.
Ben's honey-mustard sauce has 5 cups honey and 8 cups mustard.

Part A

Graph and label a line to represent each ratio.

Part B

Explain how to use the two lines and a straightedge to determine whose honey-mustard sauce is more honey-tasting.

Part C

Jenna makes a sauce with 4 cups of honey and 6 cups of mustard. Order the three sauces from most to least honey-tasting. Explain your reasoning.