

One in a Hundred

Percents

Students should be able to answer these questions after Lesson 6.1:

- What does percent mean?
- How can you convert a decimal to a percent?
- How can you convert a fraction to a percent?

Directions

Read Question 1 and its solution. Then complete Questions 2 and 3.

1. One commercial says “9 out of 10 dentists who chew gum recommend Yum Gum.” Write a fraction, a decimal, and a percent to represent the dentists who recommend the gum.

Step 1 Write the fraction. In this case, 9 is the part of the whole (numerator) and 10 is the total (denominator). Be sure to simplify.

$$\frac{9}{10} \begin{array}{l} \text{numerator} \\ \text{denominator} \end{array}$$

Step 2 Convert the fraction to a decimal. Find the equivalent fraction with 100 as the denominator, then write the decimal equivalent.

$$\frac{9}{10} = \frac{90}{100} = 0.90 \text{ or } 0.9$$

Step 3 Convert the decimal to a percent.

$$0.9 = 0.90 = 90\%$$

2. In a survey of 100 students at Grover Middle School, 46 students said that they like Yum Gum the best. Write the number of students who like the gum best as a fraction, a decimal, and a percent.
3. In one class at Grover, a teacher surveyed 25 students. She found that 12 of her students liked Yum Gum best. Write the number of students who like the gum best as a fraction, a decimal, and a percent.

Brain Waves

Making Sense of Percents

Students should be able to answer these questions after Lesson 6.2:

- How can you find 1% of a number?
- How can you find any percent of a number?

Directions

Read Question 1 and its solution. Then complete Questions 2 through 6.

1. The heart and blood vessels in a human body make up 8% of the total body weight. A person weighs 70 pounds. How much do the heart and blood vessels weigh?

Step 1 Find 1% of 70 pounds.

$$\frac{1}{100} \times 70 \text{ or } 0.01 \times 70 = 0.7 \text{ pound}$$

Step 2 Multiply 1% of 70 pounds by the percent that the heart and blood vessels make up.

$$0.7 \times 8 = 5.6 \text{ pounds}$$

In a person weighing 70 pounds, the heart and blood vessels weigh 5.6 pounds.

2. How much do the heart and blood vessels weigh in a person who weighs 83 pounds?
3. About 70% of a person's body is made up of water. A person weighs 98 pounds. How much of that is water?
4. About 90% of a cactus is made up of water. A small saguaro cactus weighs 850 pounds. How much of the weight is water?
5. About 65% of a banana is water. An unpeeled banana weighs 156 grams. How much of the weight is water?
6. A banana weighs 7 ounces. How much of the weight is water?

Commissions, Taxes, and Tips

Finding the Percent of a Number

Students should be able to answer these questions after Lesson 6.3:

- How can a proportion help you find the percent of a number?
- How is a percent similar to a proportion?
- Which method helps you more easily find the percent of a number?

Directions

Read Question 1 and its solution. Then complete Questions 2 through 4.

1. The restaurant bill for you and three friends is \$42.25. You leave a tip that is 15% of the bill. Find the total cost.

Step 1 Set up the problem as a proportion to find the amount of the tip.

$$\text{percent as a fraction} = \frac{\text{tip}}{\text{bill}}$$

$$\frac{15}{100} = \frac{\text{tip}}{\$42.25}$$

Step 2 Cross-multiply.

$$15 \times \$42.25 = 100 \times \text{tip}$$

$$\$633.75 = 100 \times \text{tip}$$

Step 3 Divide each side by 100 to find the amount of the tip. Round to the nearest cent.

$$\$633.75 \div 100 = 100 \times \text{tip} \div 100$$

$$\$6.3375 = \text{tip}$$

So, the tip is \$6.34.

Step 4 Add the tip to the bill to find the total cost.

$$\$6.34 + \$42.25 = \$48.59$$

So, the total cost is \$48.59.

2. To help promote the new desserts, your waitress gets 10% commission on each dessert she serves. She earns \$67.50 in salary and tips in one night. She serves \$21.30 worth of desserts in an evening. What is the commission she earns for serving desserts?
3. You buy the latest publishing software to write your club newsletter. It costs \$29.99 and the sales tax is 8%. How much will you pay altogether?
4. At some restaurants, the busboy is given 5% of the tips earned by the server in the section he works. The busboy earns \$41.25 in salary one evening and the waitress earns \$35.50 in tips in an evening. How much did the busboy make altogether?

6.4

Find It on the Fifth Floor

Finding One Whole, or 100%

Students should be able to answer this question after Lesson 6.4:

- How can you use a proportion to find a number that corresponds to 100%?

Directions

Read Question 1 and its solution. Then complete Questions 2 through 4.

1. You bought a new shirt. It was on sale for 30% off of the original price. If you paid \$18 for the shirt, what was the original price?

Step 1 Find the percent amount for the sale price. It was 30% off, so subtract 30% from 100%, which would be the original price.

$$100\% - 30\% = 70\%$$

Step 2 Set up the proportion using the information you know so far.

$$\frac{\text{part}}{\text{whole}} = \frac{70}{100} \quad \frac{\text{part}}{\text{whole}} = \frac{\$18}{\text{original price}}$$

$$\frac{70}{100} = \frac{\$18}{x}$$

Step 3 Cross-multiply to find x , or the original price.

$$100 \times 18 = 70x$$

$$1800 = 70x$$

$$1800 \div 70 = 70x \div 70$$

$$25.714285 \dots \approx x$$

Step 4 Round to the nearest hundredth to represent dollars and cents.

So, the shirt originally cost \$25.71.

2. At the same 30% off sale, you find a pair of pants on sale for \$21. How much did the pants cost originally?
3. The store had another sale a week later, but it discounted the items by only 25% off of the original price this time. If you found another shirt for \$18, what was the original price?
4. A clearance rack had items discounted by 40% off of the original price. You bought a belt for \$8.50. What was the original cost of the belt?

It's Your Money

Finding Percents Given Two Numbers

Students should be able to answer this question after Lesson 6.5:

- How can you use a proportion to find a percent?

Directions

Read Question 1 and its solution. Then complete Questions 2 through 4.

1. A painting company receives \$2500 for painting a house. Ryan's boss pays him a certain percent of the total amount paid for painting a house. Ryan receives \$500 in payment for helping paint the house. What percent of the total amount does Ryan get paid?

Step 1 Set up a proportion.

$$\frac{\text{part}}{\text{whole}} = \frac{x}{100} \qquad \frac{\text{part}}{\text{whole}} = \frac{\text{Ryan's payment}}{\text{company's payment}} = \frac{\$500}{\$2500}$$

$$\frac{x}{100} = \frac{\$500}{\$2500}$$

Step 2 Cross-multiply to find x , which is the percent that Ryan gets paid.

$$100 \times 500 = 2500x$$

$$50,000 = 2500x$$

$$50,000 \div 2500 = 2500x \div 2500$$

$$20 = x$$

So, Ryan earns 20% of the total amount that the company is paid.

2. The painting company charges more money to paint a house than it actually costs them, because the company needs to earn a profit. It costs the company \$1800 to paint a house and they charge \$2500 to do the job. What percent of the amount received goes to pay expenses?
3. One week, Ryan worked more hours than usual so the company paid him a higher percent than usual. The company received \$1200 for the job and Ryan was paid \$300. What percent of the total amount did Ryan earn?
4. One paint store buys paint for \$7 a gallon. The paint store sells it to Ryan's company for \$10.50 a gallon. What percent of the original price is the markup price on the paint? (Hint: Write a ratio of the cost of the paint to Ryan's company over the cost of the paint to the paint store.)

So You Want to Buy a Car

Percent Increase and Percent Decrease

Students should be able to answer these questions after Lesson 6.6:

- What is the formula for finding percent increase or percent decrease?
- What is percent increase and percent decrease?

Directions

Read Question 1 and its solution. Then complete Questions 2 and 3. Round your answers to the nearest tenth, if necessary.

1. A local store is having a sale on ice scrapers. The ice scraper that you buy for your car was originally \$7.50. You buy it for \$4.00. What is the percent decrease?

Step 1 Find the difference in prices by subtracting the new price from the original price. This gives you the amount of decrease (because the price went down).

$$\$7.50 - \$4.00 = \$3.50$$

Step 2 Set up the ratio as shown.

$$\text{percent decrease} = \frac{\text{amount of decrease}}{\text{original amount}} = \frac{\$3.50}{\$7.50}$$

Step 3 Divide.

$$\frac{\$3.50}{\$7.50} \approx 0.4667$$

Step 4 Change the decimal to a percent by multiplying by 100.

$$0.4667 \times 100 = 46.67\%$$

Step 5 Round the number to the nearest tenth. If the number in the hundredths place is 5 or greater, round the tenths place up. Otherwise leave the tenths as it is. Delete the hundredths place.

$$\begin{array}{c} 46.67\% \\ \swarrow \quad \searrow \\ \text{tenths} \quad \text{hundredths} \end{array}$$

$$46.67\% \approx 46.7\%$$

So, the cost of the ice scraper had a percent decrease of 46.7%.

2. With summer coming, the store raised its prices for car sunshades. The original price was \$5.00, but the price is now \$6.75. What is the percent increase?
3. After the summer rush, the store will lower the sunshade prices from \$6.75 to \$4.50. What is the percent decrease from the summer markup?

Students should be able to answer these questions after Lesson 7.1:

- What is an integer?
- What are negative and positive integers?
- What is a number line and how is it used?

Directions

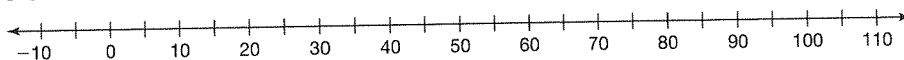
Read Question 1 and its solution. Then complete Questions 2 and 3.

1. Below is a list of the lowest and highest temperatures for each season in Aidan's hometown.

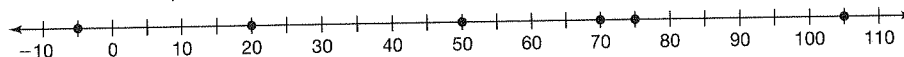
Spring: 20° and 70° Summer: 50° and 105° Fall: 20° and 75° Winter: -5° and 50°

Plot each number on a number line. Then find the difference in degrees between the highest and lowest temperature on your number line.

- Step 1** Make your number line. Mark the 0 point. Make sure your line extends far enough to the right to include the highest number and far enough to the left to include the lowest number. On the number line below, each mark represents 5 units.



- Step 2** Plot each temperature on the number line.



- Step 3** Find the highest and lowest temperatures (105° and -5°).

- Step 4** Count the number of units on the number line between these two numbers. The difference is 110° .

Working with a Number Line

On a number line, integers to the right of 0 are positive, while those to the left are negative. Numbers to the right of the point representing 0 are larger than those to the left.

2. On a number line, find the difference between the daily low and high temperatures of -7° and 19° .
3. On a number line, find the difference between a company's largest weekly profit ($\$7500$) and its largest weekly loss ($\$4000$).

Students should be able to answer these questions after Lesson 7.2:

- How can you add positive and negative integers?
- How can you represent addition of positive and negative integers in diagrams and number lines?

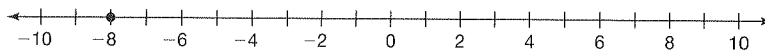
Directions

Read Question 1 and its solution. Then complete Questions 2 and 3.

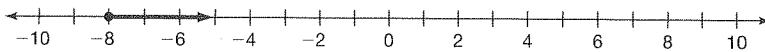
1. Represent the movement on a number line of the integer addition problem below.

$$(-8) + 3 =$$

Step 1 Start at -8 by graphing on the number line.



Step 2 Then move 3 units to the right. Represent this movement by drawing an arrow that starts at -8 and ends 3 units to the right of -8 . You move to the right because you are adding a positive integer, 3. If you were adding a negative integer you would move to the left on the number line.



Step 3 Read the location of the arrow head.
The answer is -5 .

$$\text{So, } (-8) + 3 = -5.$$

Adding Integers

Move to the right on a number line when adding a positive integer. Move to the left when adding a negative integer.

2. Represent the movement on a number line of the integer addition problem below.

$$7 + (-9) =$$

3. Represent the movement on a number line of the integer addition problem below.

$$(-3) + (-5) =$$

Subtracting Integers

Students should be able to answer these questions after Lesson 7.3:

- How can you subtract positive and negative integers?
- How can you represent subtraction of positive and negative integers in number lines?
- How do subtraction and addition of negative integers compare?

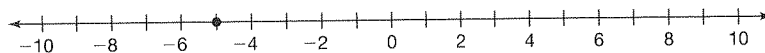
Directions

Read Question 1 and its solution. Then complete Questions 2 and 3.

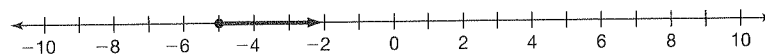
1. Use a number line to find the difference in the integer subtraction problem below.

$$(-5) - (-3) =$$

Step 1 Start at -5 by graphing on the number line.



Step 2 Then move 3 units to the right. Represent this movement by drawing an arrow that starts at -5 and ends 3 units to the right of -5 . You move to the right because you are subtracting a negative integer, -3 . If you were subtracting a positive integer, you would move to the left on the number line.



Step 3 Read the location of the arrow head. The answer is -2 .

$$\text{So, } (-5) - (-3) = -2.$$

Subtracting Integers

Move to the left on a number line when subtracting a positive integer.
Move to the right when subtracting a negative integer.

2. Use a number line to find the difference in the integer subtraction problem below.

$$6 - (-4) =$$

3. Use a number line to find the difference in the integer subtraction problem below.

$$(-4) - 5 =$$

Checks and Balances

Multiplying and Dividing Integers

Students should be able to answer these questions after Lesson 7.4:

- How can you multiply positive and negative integers?
- How can you divide positive and negative integers?

Directions

Read Question 1 and its solution. Then complete Questions 2 and 3.

1. Multiply 9 and -4 . Then divide the product by 12.

Step 1 Set up an equation for the multiplication problem.

$$9 \times (-4) =$$

Step 2 Find the product. Check to see that the sign of your answer is correct.

$$9 \times (-4) = -36$$

The product is a negative integer because the product of a positive and a negative integer is a negative integer.

Step 3 Now set up an equation for the division problem.

$$\frac{-36}{12} =$$

Step 4 Find the quotient. Check to see that the sign of your answer is correct.

$$\frac{-36}{12} = -3$$

The quotient is a negative integer because the quotient of a positive and a negative integer is a negative integer.

Multiplying and Dividing Integers

The product or quotient of a positive integer and a negative integer is a negative integer. The product or quotient of two positive integers is a positive integer. The product or quotient of two negative integers is also a positive integer.

2. Multiply -6 and 5. Then divide the product by -10 .

3. Multiply -3 and -8 . Then divide the product by -6 .

Weight of a Penny

Absolute Value and Additive Inverse

Students should be able to answer these questions after Lesson 7.5:

- What is a number's absolute value?
- How can you write a number's absolute value?
- What is an additive inverse?
- What is a number's opposite?

Directions

Read Question 1 and its solution. Then complete Questions 2 and 3.

1. Find the distance between 6 and 17 on a number line by writing an absolute value expression. Then write the additive inverse of the answer.

Step 1 Write an absolute value expression to represent the situation.

The distance between 6 and 17 is $|6 - 17|$.

Step 2 Find the difference inside the absolute value symbol first.

$$|6 - 17| = |-11|$$

Step 3 Write the absolute value of -11 , which is 11.

$$|-11| = 11$$

Step 4 Write the additive inverse of the answer, 11.

The additive inverse of 11 is the number such that the sum of the given number and its additive inverse is 0.

$$11 + (-11) = 0$$

-11 is the additive inverse of 11.

Additive Inverse

The additive inverse of any number is the number such that the sum of the given number and its additive inverse is 0. For instance, the additive inverse of -7 is 7, because $-7 + 7 = 0$.

2. Find the distance between 9 and -5 on a number line by writing an absolute value expression. Then write the additive inverse of the answer.
3. Find the distance between -8 and 1 on a number line by writing an absolute value expression. Then write the additive inverse of the answer.

Exploring the Moon

Powers of Ten

Students should be able to answer these questions after Lesson 7.6:

- How can you represent numbers using powers of ten?
- How can you multiply and divide using powers of ten?

Directions

Read Question 1 and its solution. Then complete Questions 2 and 3.

1. Find the product using powers of ten. Then write the answer in expanded form using powers of ten.

$$8.3005 \times 100$$

Step 1 Count the number of zeros in the power of ten.

$$100 = 10^2$$

Step 2 Because you are multiplying by a power of ten greater than 1, move the decimal point two places to the right, one place for each zero in 100.

$$8.3005 \times 10^2 = 830.05$$

Step 3 Write the number in expanded form using powers of ten.

$$830.05 = (8 \times 10^2) + (3 \times 10^1) + (0 \times 10^0) + (0 \times 10^{-1}) + (5 \times 10^{-2})$$

Multiplying and Dividing Using Powers of Ten

When you multiply or divide by powers of ten, you move the decimal point one place to the right or left for each zero in the power of ten. Move the decimal point to the left when you are multiplying by powers less than 1 and dividing by powers greater than 1. Move the decimal point to the right when you are multiplying by powers greater than 1 and dividing by powers less than 1.

2. Find the product using powers of ten. Then write the answer in expanded form using powers of ten.

$$72.79 \times 0.01$$

3. Find the quotient using powers of ten. Then write the answer in expanded form using powers of ten.

$$0.542 \div 100$$

Expanding Our Perspective

Scientific Notation

Students should be able to answer these questions after Lesson 7.7:

- What is scientific notation?
- How can you write very large numbers in scientific notation?
- How can you write very small numbers in scientific notation?

Directions

Read Question 1 and its solution. Then complete Questions 2 and 3.

1. Write 784,100,000,000,000 in scientific notation.

Step 1 Begin by writing the number as a decimal between 1 and 10.

7.841

Step 2 Then multiply the decimal by a power of 10. To find which power of 10 to use, count the number of places that the decimal point moved when you wrote the number as a decimal between 1 and 10. This method works for both very large numbers, written as positive powers of 10, and very small numbers, written as negative powers of 10.

784,100,000,000,000 \rightarrow 7.841 move the decimal point 14 places to the left.

Step 3 The number of places the decimal point moved represents the power of 10 by which you must multiply the decimal.

$$784,100,000,000,000 = 7.841 \times 10^{14}$$

Scientific Notation

When converting standard form to scientific notation, first write the number as a decimal between 1 and 10. Then multiply the decimal by a power of 10. To find which power of 10, count the number of places the decimal point moved when you wrote the number as a decimal between 1 and 10. The number of places is the power of 10 to use to write the number in scientific notation. The power can be positive, for large numbers, or negative, for small numbers.

2. Write 0.000000000912 in scientific notation.

3. Write 6.05×10^8 in standard form.

Students should be able to answer these questions after Lesson 8.1:

- How can you use a picture to represent a problem?
- How can you use a picture to solve a problem?

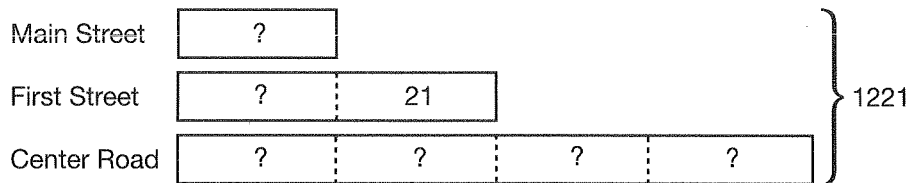
Directions

Read Question 1 and its solution. Then complete Question 2.

8

- In Smallville, three intersections get the most traffic. On weekdays, 1221 cars go through Main Street, First Street, and Center Road. First Street gets twenty one more cars than Main Street. Center Road gets four times as many as Main Street. How many cars go through each intersection?

Step 1 Draw a diagram to represent each intersection. Label the diagram.



Step 2 Write a word equation using the labels from your diagram.

$$\text{Main Street} + \text{First Street} + \text{Center Road} = 1221 \text{ cars}$$

$$\text{Main Street} + (\text{Main Street} + 21) + (4 \times \text{Main Street}) = 1221 \text{ cars}$$

Step 3 Change the words to be variables. Let m represent Main Street.

$$m + (m + 21) + (4 \cdot m) = 1221$$

Step 4 Solve the equation by combining the variables, then isolating the variable.

$$6m + 21 = 1221$$

$$6m + 21 - 21 = 1221 - 21$$

$$6m = 1200$$

$$m = 200$$

So, 200 cars go through Main Street, 221 cars go through First Street, and 800 cars go through Center Road.

- Three schools in the Smallville School district have a total of 645 students. Hayes School has 20 more students than Taft School. Adams School has 25 more students than two times the number of students in Taft School. How many students are in each school?

Computer Games, CDs, and DVDs

Writing, Evaluating, and Simplifying Expressions

Students should be able to answer these questions after Lesson 8.2:

- What is an algebraic expression?
- How can you solve an algebraic expression?

Directions

Read Question 1 and its solution. Then complete Question 2.

1. Mark sells copper roses online. For each copper rose, he makes \$35 minus about \$5 in supplies. Then he also must subtract about \$9 per order for shipping. Complete the chart to find Mark's profit for each order.

Step 1 Write an algebraic expression for each order. Let f represent the number of flowers.

$$\text{each flower} \times (\$35 - \$5) - \$9$$

$$f(30) - 9$$

Step 2 Substitute the number of flowers for f in the algebraic expression to find the total profit for each order.

Number of Roses Ordered	Algebraic Expression $f(30) - 9$	Mark's Total Profit
2	$(30 \times 2) - 9 = 60 - 9$	\$51
5	$(30 \times 5) - 9 = 150 - 9$	\$141
12	$(30 \times 12) - 9 = 360 - 9$	\$351

So, Mark's profit is \$51 on an order of 2 roses, \$141 on an order of 5 roses, and \$351 on an order of 12 roses.

2. Mark buys his copper at a scrap yard. For each rose, he needs about 16 inches of copper wire and about 8 square inches of sheet copper. Use the table to help Mark determine the amount of each kind of copper he needs for each rose order. Let r represent the number of roses.

Number of Roses Ordered	Algebraic Expression for Copper Wire	Total Copper Wire Needed for the Order	Algebraic Expression for Sheet Copper	Total Sheet Copper Needed for the Order
2	$16r = 16 \times 2$		$8r = 8 \times 2$	
5	$16r = 16 \times 5$		$8r = 8 \times 5$	
12	$16r = 16 \times 12$		$8r = 8 \times 12$	

Selling Cars

Solving One-Step Equations

Students should be able to answer these questions after Lesson 8.3:

- What is an equation?
- How can you solve a one-step equation?

Directions

Read Question 1 and its solution. Then complete Questions 2 through 4.

8

1. Kaitlyn's parents are buying a new van for \$3000 off the original price. The new price is \$27,000. What is the original price of the van?

Step 1 Write an expression with a variable. Let p represent the original price.

$$p - 3000$$

Step 2 Write an equation using the expression from Step 1.

$$p - 3000 = 27,000$$

Step 3 Choose a method for solving the one-step equation from the three methods shown below.

$z + 6 = 14$ $z + 6 - 6 = 14 - 6$ $z + 0 = 8$ $z = 8$	$z + 6 = 14$ $\underline{-6 = -6}$ $z + 0 = 8$ $z = 8$	$z + 6 = 14$ $z + 6 + (-6) = 14 + (-6)$ $z + 0 = 8$ $z = 8$
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Step 4 Solve the equation.

$$p - 3000 = 27,000$$

$$p - 3000 + 3000 = 27,000 + 3000$$

$$p = 30,000$$

So, the original price is \$30,000.

2. Kaitlyn's parents decided to add a DVD player to the van for Kaitlyn and her sister to watch on trips. This costs \$1900 extra. How much does the van cost now? Write and solve an equation to find your answer.
3. If Kaitlyn's parents decide to trade in their SUV for the van, they would get $\frac{1}{5}$ off the original price of the van instead of \$3000 off. How much would they get off if they make the trade? Write and solve an equation to find your answer.
4. Kaitlyn figures the new van will hold her 3 suitcases. That leaves enough room for 7 more pieces of luggage. How much luggage will the van hold altogether? Write and solve an equation to find your answer.

A Park Ranger's Work Is Never Done

Solving Two-Step Equations

Students should be able to answer these questions after Lesson 8.4:

- What is an inverse operation?
- How can you solve a two-step equation using inverse operations?

Directions

Read Question 1 and its solution. Then complete Questions 2 and 3.

8

- Hickory Lookout Tower has 9 staircases. Every staircase has the same number of steps except for the last one, which has eleven less. The tower has 133 steps in all. How many steps are on each staircase?

Step 1 Write the equation. Let n represent the total number of steps.

$$9 \text{ staircases} \times n \text{ steps} - 11 = 133 \text{ steps}$$

$$9n - 11 = 133$$

Step 2 Use an inverse operation to “undo” an operation in the equation. Whatever you do to one side, you must do to the other side to keep the sides equal. Hint: It’s easiest to start with the number that’s not “tied” to the variable.

$$9n - 11 + 11 = 133 + 11$$

$$9n - 0 = 144$$

$$9n = 144$$

Step 3 Use an inverse operation to undo an operation so that the variable is by itself on one side of the equation.

$$9n \div 9 = 144 \div 9$$

$$1n = 16$$

$$n = 16$$

So, there are 16 steps in each of 8 staircases and 5 steps in the last staircase.

- The park usually has the same number of programs every week of the year except that there are 14 extra programs in the summer. The park has 170 programs a year (a year has 52 weeks). How many programs happen in a normal week?
- Ranger Lloyd found that of the visitors coming through his gate, three fourths plus two of the visitors wanted maps of the park. If 152 people wanted maps one day, how many people went through Ranger Lloyd’s gate that day?

Where's the Point?

Plotting Points in the Coordinate Plane

Students should be able to answer these questions after Lesson 8.5:

- How can you name points in a coordinate plane?
- How can you graph points in a coordinate plane?

Directions

8

Read Question 1 and its solution using the coordinate plane at the bottom of the page. Then complete Questions 2 and 3.

- The Carmonas family lives near the middle of town. To find them, go from coordinates $(0, 0)$ to the letter C. Where do they live?

Step 1 First find the coordinates $(0, 0)$. Write the letter *E* there to mark the edge of town.

Step 2 Find the letter *C* that represents the Carmonas' house. It is 5 lines to the right on the line marked *x*-axis and up 6 lines on the line marked *y*-axis.

Step 3 Write the ordered pair in the order (x, y) .

$(5, 6)$

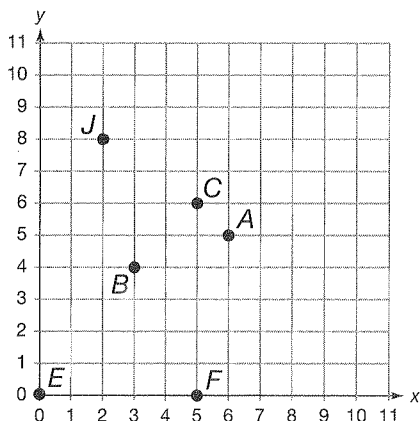
So, the Carmonas family lives at $(5, 6)$.

- Write the letter of the point that appears at each ordered pair in the coordinate plane.

$(3, 4)$ ____ $(5, 0)$ ____ $(2, 8)$ ____ $(6, 5)$ ____

- Graph these points in the coordinate plane. Remember to label them using the letter given.

$M(7, 9)$ $N(0, 5)$ $P(8, 0)$ $Q(3, 10)$



Get Growing!

Using Tables and Graphs

Students should be able to answer these questions after Lesson 8.6:

- How can you complete a table of values?
- How can you use a table of values to create a graph?

Directions

Read Question 1 and its solution. Then complete Question 2.

8

- Emme's cactus produced 1 piece of fruit one day, then two more pieces than the previous day each day for a week. Then the plant produced two less pieces of fruit than the previous day until it stopped producing fruit. How many pieces of fruit did Emme's cactus produce each day?

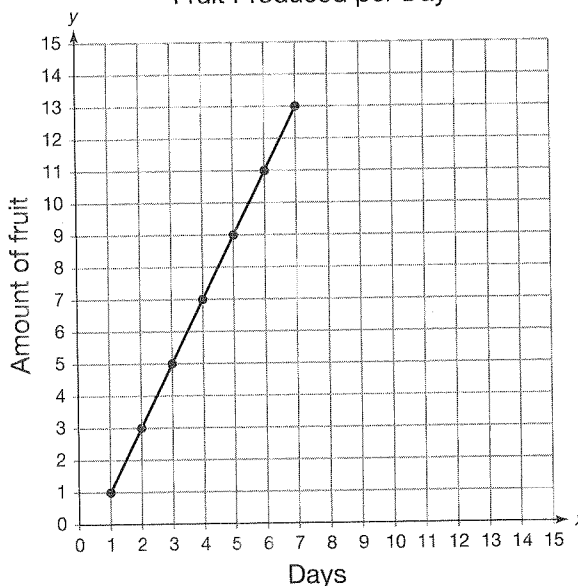
Step 1 Write an expression to represent the amount of fruit the cactus produced beginning with Day 2.

$$y + 2 \quad y = \text{the number of pieces of fruit produced the previous day}$$

Step 2 Use the expression to complete Days 2 through 7 in the table.

Day	Amount of Fruit
1	1
2	$y + 2 = 3$
3	$y + 2 = 5$
4	$y + 2 = 7$
5	$y + 2 = 9$
6	$y + 2 = 11$
7	$y + 2 = 13$
8	
9	
10	
11	
12	
13	
14	

Fruit Produced per Day



Step 3 Write each row in the table as an ordered pair (x, y) . The day is the x -coordinate and the amount of fruit is the y -coordinate.

$$(1, 1), (2, 3), (3, 5), (4, 7), (5, 9), (6, 11), (7, 13)$$

Step 4 Plot each point in the coordinate plane. Then draw a line through the points.

- Complete the table and the coordinate plane by following each step for the second week of fruit production for Emme's cactus.

Saving Energy

Solving Problems Using Multiple Representations

Students should be able to answer these questions after Lesson 8.7:

- How can you complete a table of values?
- How can you use a table of values to create a graph?

Directions

Read Question 1 and its solution. Then complete Questions 2 and 3.

8

- Joey's family decided to conserve water by using a different shower head. Their old shower head used 6 gallons of water per minute. The new shower head uses 25% less water. How much less water is Joey's family using?

Step 1 Write an expression to represent the amount of water saved by the new shower head. Let m represent the number of minutes in the shower. So, $6m$ represents the number of gallons used by the old shower head.

$$6m \cdot 25\% = 6m \cdot 0.25$$

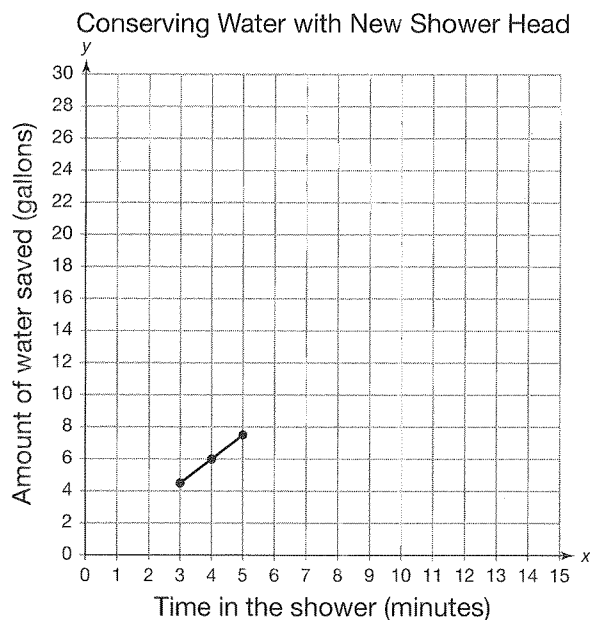
Step 2 Use the expression to complete the first three rows of the table below.

Time in the Shower	Amount of Water Saved
minutes	gallons
m	$6m \cdot 0.25$
3	$6(3) \cdot 0.25 = 4.5$
4	$6(4) \cdot 0.25 = 6$
5	$6(5) \cdot 0.25 = 7.5$
10	
12	
13	
15	

Step 3 Write each row in the table as an ordered pair (x, y) . The time is the x -coordinate and the amount of water saved is the y -coordinate.

$$(3, 4.5), (4, 6), (5, 7.5)$$

Step 4 Plot each point in the coordinate plane. Then draw a line through the points.



- Complete the table, the coordinate plane, and the line.
- About how many minutes do you think Joey showered if he saved about 12 gallons of water? What two ways could you use to find the answer? Use complete sentences in your answers.

Figuring All of the Angles

Angles and Angle Pairs

Students should be able to answer these questions after Lesson 9.1:

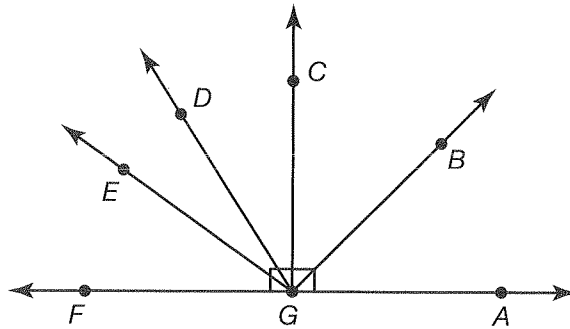
- What is the unit of measurement for angles?
- How can you determine whether an angle is acute, obtuse, right, or straight?
- What are alternate interior angles, and what is the relationship of their measures?
- What are alternate exterior angles, and what is the relationship of their measures?
- What are vertical angles, and what is the relationship of their measures?

Directions

Read Question 1 and use the table below to complete Step 1 through Step 3. Then complete Question 2.

1. Use your protractor to measure the angles below. Don't forget to first identify each angle as right, acute, obtuse, or straight. Record the angle measures in the table.

Angle	Type of Angle	Measure
$\angle AGB$		
$\angle AGC$		
$\angle AGD$		
$\angle AGF$		
$\angle FGD$		
$\angle FGC$		



For each of the angles listed above:

Step 1

Find the angle.

Step 2

Tell whether the angle is acute, right, obtuse, or straight. Enter the angle's type in the second column of the table.

Step 3

Read the angle's measure from the protractor. Enter the angle's measure in the third column of the table.

2. Identify $\angle FGE$, $\angle FGB$, and $\angle FGA$. Then find the measure of each angle.

A Collection of Triangles

Classifying Triangles

Students should be able to answer these questions after Lesson 9.2:

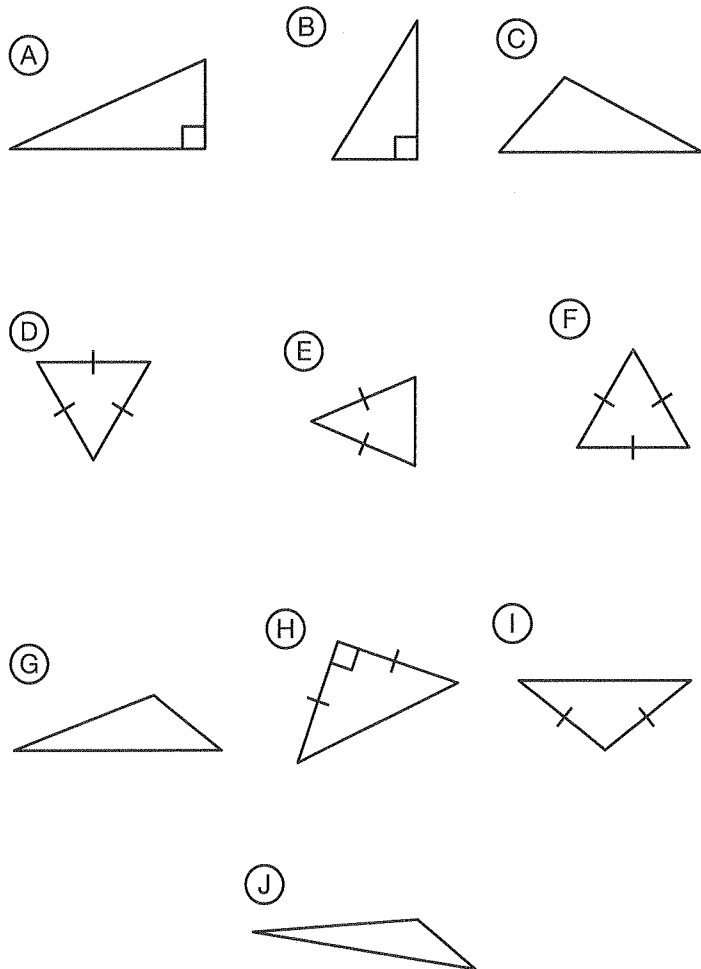
- What are the different kinds of triangles?
- What is the sum of the measures of the angles in a triangle?
- What combinations of side lengths can form a triangle? What combinations cannot?

Directions

Read and complete Question 1.

1. Below are the triangles that you were asked to classify at the start of Lesson 9.2. Now that you have learned the categories of triangles—equilateral, isosceles, scalene, acute, obtuse, and right—classify them again, using these categories. A triangle may fit into more than one category. Assume that sides of a triangle are not equal in measure, and that angles are not right angles, unless they are so marked.

Category	Triangles
equilateral	
isosceles	
scalene	
acute	
obtuse	
right	



The Signs Are Everywhere

Quadrilaterals and Other Polygons

Students should be able to answer these questions after Lesson 9.3:

- What is a trapezoid, parallelogram, rhombus, rectangle, or square?
- What are the names of polygons with 3, 4, 5, 6, 7, 8, 9, and 10 sides?

Directions

Read and complete Question 1.

1. In class you completed this table showing the sum of the measures of the angles of polygons with 4, 5, 6, 7, 8, 9, and 10 sides.

Polygon	Number of Sides	Number of Triangles	Sum of the Measures of the Angles of the Polygon
Quadrilateral	4	2	360°
Pentagon	5	3	540°
Hexagon	6	4	720°
Heptagon	7	5	900°
Octagon	8	6	1080°
Nonagon	9	7	1260°
Decagon	10	8	1440°

Draw a polygon, regular or irregular, with 4, 5, 6, 7, 8, 9, or 10 sides. Measure its angles and add the measures. How close does the sum come to the value shown in the table?

Quadrilaterals and Other Polygons

All squares are rhombuses, all squares are rectangles, and all squares are parallelograms. All rhombuses are parallelograms and some rhombuses are squares. Some rectangles are not squares, some parallelograms are not rhombuses, and some rhombuses are not squares. A trapezoid is not a rectangle or a parallelogram, so it is not a square or a rhombus.

Similar Polygons

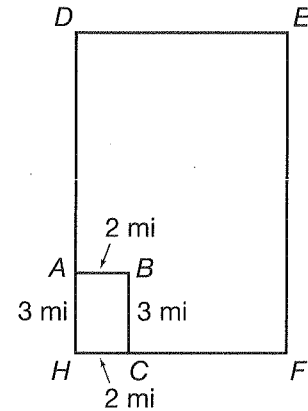
Students should be able to answer these questions after Lesson 9.4:

- What is a scale factor?
- What are similar polygons?
- What is the relationship between corresponding sides of similar polygons?
- What is the relationship between corresponding angles of similar polygons?

Directions

Read the scenario and Question 1. Then complete Question 2.

You recently began training for a 100-mile bicycle marathon. Every evening, you follow a rectangular route from your house. During the first month of training, you ride your bicycle 3 miles north, 2 miles east, 3 miles south, and 2 miles west.



- 9
1. During the second month of training, you plan to follow a rectangular route that is similar to the original route. You plan to increase the rectangular route by a scale factor of 4. What is the total distance that you will bicycle each evening during the second month of training?

Step 1 Draw a diagram of the bicycle route during the first month. Rectangle $HABC$ represents the original route.

Step 2 To find the distance that you travel north in the new route, multiply the original distance by 4. So, the new distance that you travel north is $4 \cdot 3$ miles = 12 miles. Draw a diagram of the bicycle route during the second month. Rectangle $HDEF$ represents the new route. \overline{HD} represents the distance that you travel north in the new route.

Step 3 To find the new distance that you travel east, multiply the original distance by 4. So, the new distance that you travel east is $4 \cdot 2$ miles = 8 miles.

In a similar manner, you can find that EF is 12 miles and FH is 8 miles.

Step 4 To find the total distance of the bicycle route during the second month, find the sum of the side lengths of figure $HDEF$.

$$12 \text{ miles} + 8 \text{ miles} + 12 \text{ miles} + 8 \text{ miles} = 40 \text{ miles}$$

So, the total distance of the bicycle route during the second month is 40 miles.

2. During the third month of training, you want to bicycle a route equal in distance to the length of the marathon each weekend. You still want the route to be similar to your original route. How far must you bicycle in each direction?

Students should be able to answer these questions after Lesson 9.5:

- What is indirect measurement?
- How does indirect measurement work?

Directions

Read the scenario and Question 1. Then complete Question 2.

A toy company makes three sizes of its Turnip Toddler doll. The smallest doll is 12 inches tall. The medium-sized doll is 18 inches tall. The largest doll is 30 inches tall. All three of the dolls are proportional to each other. The width of the smallest doll's shoulders is 4 inches across. The distance around its hips is 8 inches.

1. What are the measurements of the medium-sized doll?

Step 1 To find the width of the medium-sized doll's shoulders, write a proportion.

$$\frac{\text{small doll's height}}{\text{medium-sized doll's height}} = \frac{\text{small doll's shoulders}}{\text{medium-sized doll's shoulders}}$$

$$\frac{12 \text{ inches}}{18 \text{ inches}} = \frac{4 \text{ inches}}{x}$$

$$\frac{12 \text{ inches}}{18 \text{ inches}} = \frac{4 \text{ inches}}{6 \text{ inches}}$$

So, the width of the medium-sized doll's shoulders is 6 inches.

Step 2 To find the distance around the medium-sized doll's hips, write a proportion.

$$\frac{\text{small doll's height}}{\text{medium-sized doll's height}} = \frac{\text{small doll's hips}}{\text{medium-sized doll's hips}}$$

$$\frac{12 \text{ inches}}{18 \text{ inches}} = \frac{8 \text{ inches}}{x}$$

$$18 \cdot 8 = 12 \cdot x$$

$$144 = 12x$$

$$12 = x$$

So, the distance around the medium-sized doll's hips is 12 inches.

2. What are the measurements of the largest doll?

A Geometry Game

Congruent Polygons

Students should be able to answer these questions after Lesson 9.6:

- What does congruent mean?
- How do the lengths of corresponding sides of congruent polygons compare?
- How do measures of corresponding angles of congruent polygons compare?

Directions

Read and complete Question 1.

1. Show a friend or relative the game board that you made in Lesson 9.6. Show them which sets of polygons are congruent to each other, and which are similar. For the similar polygons, tell them the scale factor. For pairs of similar polygons, talk about the scale factors and the lengths of the sides.

9

Similar Polygons

Corresponding sides of similar figures are in proportion, and corresponding angles of similar figures are equal in measure.