i-Ready®

Grade 6 Mathematics

Teacher At-Home Activity Packet

The At-Home Activity Packet includes 21 sets of practice problems that align to important math concepts that have likely been taught this year.

Since pace varies from classroom to classroom, feel free to select the pages that align with the topics your students have covered.

The At-Home Activity Packet includes instructions to the parent and can be printed and sent home.

This At-Home Activity Packet—Teacher Guide includes all the same practice sets as the Student version with the answers provided for your reference.

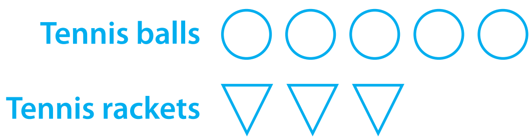
See the Grade 6 Math concepts covered in this packet!

Grade 6 Math concepts covered in this packet

Understanding Ratio Concepts

➤ **Complete each problem about ratio relationships.**

1. Ms. Omar runs the school tennis club. She has a bin of tennis balls and rackets. For every 5 tennis balls in the bin, there are 3 tennis rackets. Draw a model to show the ratio of tennis balls to tennis rackets.



Write the following ratios.

tennis balls to tennis rackets **5 : 3 or 5 to 3**

tennis balls to total pieces of tennis equipment **5 : 8 or 5 to 8**

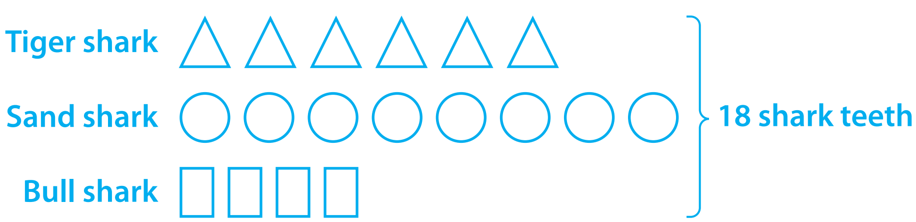
2. Christian has a collection of 18 shark teeth. He identified them as 6 tiger shark teeth, 8 sand shark teeth, and the rest as bull shark teeth.

What does the ratio 6 : 8 represent in this situation?

Possible answer: The ratio 6 : 8 is the ratio of the number of tiger shark teeth to the number of sand shark teeth.

What does the ratio 4 : 18 represent in this situation? Explain your reasoning. Include a model in your explanation.

Possible answer: $6 + 8 = 14$ and $18 - 14 = 4$, so there are 4 bull shark teeth and a total of 18 shark teeth. So, 4 : 18 is the ratio of bull shark teeth to the total number of shark teeth.



3. How are part-to-part ratios different from part-to-whole ratios?

Possible answer: Part-to-part ratios show the relationship between two separate groups that are part of a whole. Part-to-whole ratios show the relationship between one or more parts and the total number of items that make up the whole.

Using Equivalent Ratios

Solve each problem.

1. Josie is training for a race. The ratio of the number of minutes she runs to the number of miles she runs is 24 to 3. She plans to run 10 miles. How many minutes will it take her?

   80 minutes

2. A chef planning for a large banquet thinks that 2 out of every 5 dinner guests will order his soup appetizer. He expects 800 guests at the banquet. Use equivalent ratios to estimate how many cups of soup he should prepare.

   320 cups of soup

3. Fred is making a fruit salad. The ratio of cups of peaches to cups of cherries is 2 to 3. How many cups of peaches will Fred need to make 60 cups of fruit salad?

   24 cups of peaches

4. A community garden center hosts a plant giveaway every spring to help community members start their gardens. Last year, the giveaway supported 50 families by giving away 150 plants. Based on this ratio, how many plants will the center give away this year in order to support 65 families?

   195 plants

5. The first week of January, there are 49 dogs and 28 cats in an animal shelter. Throughout the month, the ratio of dogs to cats remains the same. The last week of January, there are 20 cats in the shelter. How many dogs are there?

6. A wedding planner uses 72 ivy stems for 18 centerpieces. When she arrives at the venue, she realizes she will only need 16 centerpieces. How many ivy stems should she use so that the ratio of ivy stems to centerpieces stays the same?

Understanding Rate Concepts

1 It takes Maya 30 minutes to solve 5 logic puzzles, and it takes Amy 28 minutes to solve 4 logic puzzles. Use models to show the rate at which each student solves the puzzles, in minutes per puzzle.

Possible answer:

Maya

Minutes	Number of puzzles
30	5
6	1

Amy

Minutes	Number of puzzles
28	4
7	1

If Maya and Amy had the same number of puzzles to solve, who would finish first? Explain.

Maya will finish first. Possible explanation: Maya takes 6 minutes per puzzle. Amy takes 7 minutes per puzzle.

2 A garden hose supplies 36 gallons of water in 3 minutes. Use a table of equivalent ratios to show the garden hose's water flow in *gallons per minute* and *minutes per gallon*.

Possible work:

Gallons	36	12	1
Minutes	3	1	$\frac{1}{12}$

12 gallons per minute; $\frac{1}{12}$ minute per gallon

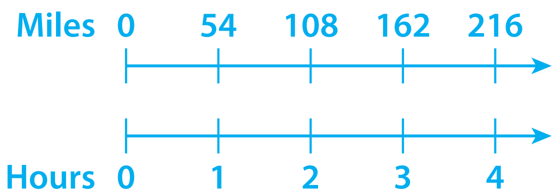
How many gallons of water does the hose supply in 10 minutes? Explain.

Possible answer: You multiply the rate in gallons per minute by 10 minutes. $10 \times 12 = 120$ gallons of water in 10 minutes.

Understanding Rate Concepts *continued*

3. Max travels to see his brother's family by car. He drives 216 miles in 4 hours. What is his rate in miles per hour? Use a double number line to show your work.

54 miles per hour; Possible work:



Suppose he makes two stops of 10 minutes each during his journey. Will he be able to reach the town in 4 hours if he keeps the speed the same?

No; Possible explanation: If he makes two 10-minute stops, he will have to travel the distance in 3 hours and 40 minutes, which means that he will not be able to reach the town in 4 hours without driving faster.

Using Unit Rates to Find Equivalent Ratios

➤ **Solve each problem. Show your work.**

1. Rachel mows 5 lawns in 8 hours. At this rate, how many lawns can she mow in 40 hours?

   25 lawns; Possible work: Since $5 \div 8 = \frac{5}{8}$, Rachel mows $\frac{5}{8}$ lawns per hour: $40 \times \frac{5}{8} = 25$. So, Rachel mows 25 lawns in 40 hours.

2. A contractor charges \$1,200 for 100 square feet of roofing installed. At this rate, how much does it cost to have 1,100 square feet installed?

   \$13,200; Possible work: Since $1{,}200 \div 100 = 12$, the roof installation costs \$12 per square foot: $1{,}100 \times 12 = 13{,}200$. So, it costs \$13,200 to install 1,100 square feet.

3. It takes Jill 2 hours to run 14.5 miles. At this rate, how far could she run in 3 hours?

   21.75 miles; Possible work: Since $14.5 \div 2 = 7.25$, Jill runs about 7.25 miles per hour: $3 \times 7.25 = 21.75$. So, Jill could run 21.75 miles in 3 hours.

4. Bobby catches 8 passes in 3 football games. At this rate, how many passes does he catch in 15 games?

   40 balls; Possible work: Since $8 \div 3 = \frac{8}{3}$, Bobby catches $\frac{8}{3}$ balls per game: $15 \times \frac{8}{3} = 40$. So, Bobby catches 40 balls in 15 games.

5. Five boxes of crackers cost \$9. At this rate, how much do 20 boxes cost?

   \$36; Possible work: Since $9 \div 5 = \frac{9}{5} = 1.80$, the crackers cost \$1.80 per box: $20 \times 1.80 = 36$. So, 20 boxes cost \$36.00.

6. It takes a jet 2 hours to fly 1,100 miles. At this rate, how far does it fly in 8 hours?

   4,400 miles; Possible work: Since $1{,}100 \div 2 = 550$, the jet flies 550 miles per hour: $550 \times 8 = 4{,}400$. So, it flies 4,400 miles in 8 hours.

Using Unit Rates to Find Equivalent Ratios *continued*

7 It takes Dan 32 minutes to complete 2 pages of math homework. At this rate, how many pages does he complete in 200 minutes?

12.5 pages; Possible work: Since $2 \div 32 = 0.0625$, Dan completes 0.0625 page per minute: $0.0625 \times 200 = 12.5$. So, he completes 12.5 pages in 200 minutes.

8 Kendra gets a paycheck of $300 after 5 days of work. At this rate, how much does she get paid for working 24 days?

$1,440; Possible work: Since $300 \div 5 = 60$, Kendra gets paid $60 per day: $60 \times 24 = 1{,}440$. So, she gets paid $1,440 for working 24 days.

9 Tim installs 45 square feet of his floor in 50 minutes. At this rate, how long does it take him to install 495 square feet?

550 minutes; Possible work: Since $50 \div 45 = \frac{10}{9}$, it takes Tim $\frac{10}{9}$ minutes per square foot: $495 \times \frac{10}{9} = 550$. So, it takes him 550 minutes to install 495 square feet.

10 Taylin buys 5 ounces of tea leaves for $2.35. At this rate, how much money does she need to buy 12 ounces of tea leaves?

$5.64; Possible work: Since $2.35 \div 5 = 0.47$, tea leaves cost $0.47 per ounce: $0.47 \times 12 = 5.64$. So, she needs $5.64 to buy 12 ounces.

11 In problem 10, how would your work be different if you were asked how many ounces of tea leaves Taylin could buy with $10?

I would find the unit rate in terms of ounces per dollar rather than dollars per ounce and then multiply by $10 to find the number of ounces Taylin could buy with that amount.

Using Unit Rates to Compare Ratios

Solve each problem. Show your work.

1 Shawn sells 36 vehicles in 4 weeks. Brett sells 56 vehicles in 7 weeks. Who sells more vehicles per week?

Shawn; Possible work: Shawn: $\frac{36}{4} = 9$ vehicles per week;
Brett: $\frac{56}{7} = 8$ vehicles per week; $9 > 8$

2 The table shows the gas mileage of two vehicles. Which vehicle travels more miles per gallon?

Car	Miles	Gallons
Pickup Truck	120	8
Minivan	180	10

Minivan; Possible work: Pickup Truck: $\frac{120}{8} = 15$; Minivan: $\frac{180}{10} = 18$;
18 mpg $>$ 15 mpg

3 Joe and Chris each have a lawn mowing business. Joe charges $40 to mow 2 acres. Chris charges $30 to mow 1.2 acres. Who charges more per acre?

Chris; Possible work: Joe: $\frac{40}{2} = 20$; Chris: $\frac{30}{1.2} = 25$; $\$25 > \$20$

4 The table shows the time it took two athletes to run different races. Who ran faster?

Athlete	Seconds	Meters
Ellen	28	200
Lindsay	60	400

Ellen; Possible work: Ellen: $\frac{200}{28} \approx 7.14$ meters per second;
Lindsay: $\frac{400}{60} \approx 6.67$ meters per second; $6.67 < 7.14$

Using Unit Rates to Compare Ratios *continued*

5 Branden and Pete each play running back. Branden carries the ball 75 times for 550 yards, and Pete has 42 carries for 380 yards. Who runs farther per carry?

Pete; Possible work: Branden: $\frac{550}{75} \approx 7.33$ yards per carry;
Pete: $\frac{380}{42} \approx 9.05$ yards per carry; $9.05 > 7.33$

6 The table shows the price of two cereal brands and the number of ounces per box. Which is the better price per ounce?

Cereal	Ounces	Price
Brand A	18	\$2.50
Brand B	24	\$3.50

Brand A; Possible work: Brand A: $\frac{2.50}{18} \approx 0.14$; Brand B: $\frac{3.50}{24} \approx 0.15$;
$\$0.14 < \$0.15$

7 Describe two different ways you could change the values in the table so that the answer to problem 6 is different.

Possible answer: I could change the price of Brand B to \$3.35 or less or change the number of ounces for Brand B to 25 ounces or more.

Using Unit Rates to Convert Measurements

Solve each problem. Show your work.

1. Susan has a 12-inch board for constructing a wooden chair. The directions say to use a board that is 29 centimeters long. Is her board long enough to cut? (1 inch = 2.54 centimeters)

   Yes; Possible work: 2.54 centimeters per inch: $12 \times 2.54 = 30.48$

   Her board is 30.48 centimeters long, so she has enough to cut 29 centimeters.

2. Kevin uses 84 fluid ounces of water to make an all-purpose cleaner. The directions call for 4 fluid ounces of concentrated soap for every 3 cups of water. How many fluid ounces of soap should he use? (1 cup = 8 fl oz)

   14 fluid ounces of soap; Possible work: 8 fl oz per cup: $8 \times 3 = 24$ fl oz of water

   4 fl oz of soap per 24 fl oz of water: $\frac{4}{24} = \frac{1}{6}$ fl oz of soap per fl oz of water

   $84 \times \frac{1}{6} = 14$

3. Shannon test-drives a car in Germany and drives 95 kilometers per hour. What is her speed in miles per hour? (1 kilometer ≈ 0.62 mile)

   58.9 miles per hour; Possible work: 0.62 mile per kilometer: $95 \times 0.62 = 58.9$

4. Keith works 8 hours per day for 5 days per week. Melba works 2,250 minutes each week. Who spends more time at work?

   Keith; Possible work: 60 minutes in 1 hour; $8 \times 5 = 40$ hours per week; $40 \times 60 = 2{,}400$ minutes, so Keith works 2,400 minutes each week. This is more than 2,250, so Keith spends more time at work.

Using Unit Rates to Convert Measurements *continued*

5 Jason runs 440 yards in 75 seconds. At this rate, how many minutes does it take him to run a mile? (1 mile = 1,760 yards)

5 minutes; Possible work: $\frac{1}{1,760}$ miles per yard, $440 \times \frac{1}{1,760} = \frac{1}{4}$ mile

He runs $\frac{1}{4}$ mile in 75 seconds, so it takes him $75 \times 4 = 300$ seconds to run a mile.

$\frac{1}{60}$ min per second, $300 \times \frac{1}{60} = 5$ minutes

6 Boxes of granola are on sale at a price of 2 for $4.50. There are 12 ounces of granola in each box. What is the unit price in dollars per pound?

$3.00 per pound; Possible work: $12 \times 2 = 24$ total ounces; 16 ounces in 1 pound; $\frac{24}{16} = 1.5$ pounds; $\frac{4.50}{1.5} = \$3.00$ per pound

7 Sam is delivering two refrigerators that each weigh 105 kilograms. There is an elevator with a weight limit of 1,000 pounds. Can he take both refrigerators on the elevator in one trip? (1 kilogram ≈ 2.2 pounds)

**Yes; Possible work: 2.2 pounds per kilogram; $105 \times 2.2 = 231$;
$231 \times 2 = 462$**

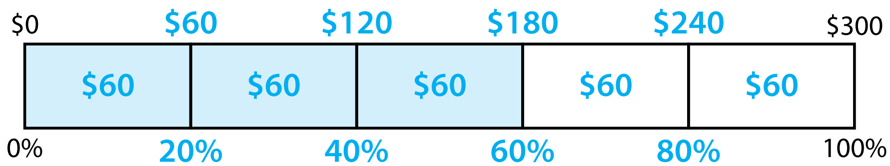
Sam can take the refrigerators in the elevator in one trip because the combined weight of the refrigerators is only 462 pounds.

8 For every 140 feet that Kelly rides on her bicycle, the wheels turn 20 times. About how many times do the wheels turn in 5 miles? (1 mile = 5,280 feet)

about 3,771 times; Possible work: 5,280 feet per mile, $\frac{20}{140} = \frac{1}{7}$ turn per foot, $5 \times 5,280 = 26,400$ feet; $26,400 \times \frac{1}{7} = 3,771.43$ turns

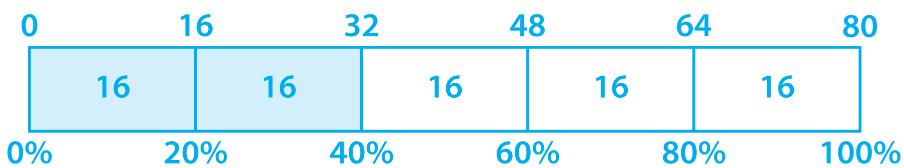
Understanding Percents

1 Emma is saving for a bicycle that costs $300. This month, she reaches 60% of her goal. Label and shade the bar model to show her progress. How much money has she saved? Explain.



$180; Possible explanation: The model is divided into 5 equal sections. Each section represents $\frac{1}{5}$ of $300, or $60. Each section also represents 20%. I shaded 3 sections to get to 60%. That is equal to $180.

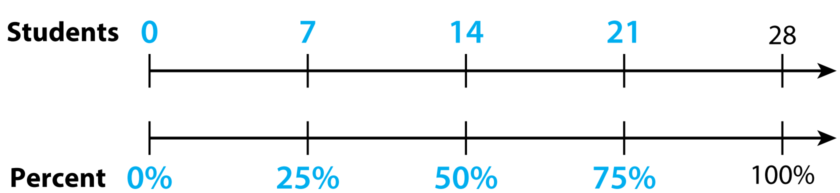
2 Justin needs to make 80 illustrations for an art book. He has made 40% of the illustrations. Make a bar model to show his progress. How many illustrations does he still need to make? Explain.



48; Possible explanation: 40% corresponds to 32 on the bar model. Therefore, he has made 32 illustrations so far and still needs to make 48 illustrations.

3 In a classroom of 28 students, 75% of the students have met their reading goal.

Label the double number line. How many students met their reading goal? What fraction of 28 students met their reading goal? Explain.



21 students; $\frac{3}{4}$; Possible explanation: 75% corresponds to 21 students. So, 21 students met their reading goal. The fraction $\frac{75}{100}$ represents 75%. Therefore, $\frac{75}{100}$, or $\frac{3}{4}$, of 28 students met their reading goal.

Finding a Percent of a Quantity

➤ **Find the percent of the number. The answers are mixed up at the bottom of the page. Cross out the answers as you complete the problems.**

1. 40% of 80 — 32
2. 25% of 60 — 15
3. 10% of 90 — 9
4. 50% of 70 — 35
5. 80% of 500 — 400
6. 75% of 80 — 60
7. 90% of 250 — 225
8. 65% of 400 — 260
9. 85% of 800 — 680
10. 55% of 140 — 77
11. 45% of 160 — 72
12. 95% of 180 — 171
13. 70% of 720 — 504
14. 15% of 220 — 33
15. 65% of 200 — 130

Answers

9	77	504	72	225
260	171	33	60	35
400	32	130	680	15

Finding the Whole

Solve each problem.

1. 25% of what number is 13?

   52

2. 50% of what number is 140?

   280

3. 10% of what number is 60?

   600

4. 5% of what number is 12?

   240

5. 30% of what number is 72?

   240

6. 70% of what number is 56?

   80

7. 95% of what number is 57?

   60

8. 75% of what number is 66?

   88

9. 85% of what number is 102?

   120

10. 45% of what number is 63?

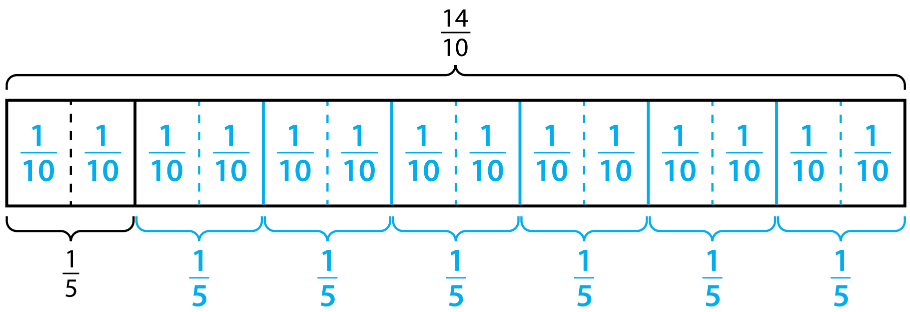
    140

11. Explain how you could use 25% of a number to find the number.

    Possible answer: 25% × 4 = 100%, so if I multiply 25% of a number by 4, I will get the number.

Understanding Division with Fractions

1 Complete the bar model to show how many $\frac{1}{5}$s make $\frac{14}{10}$.

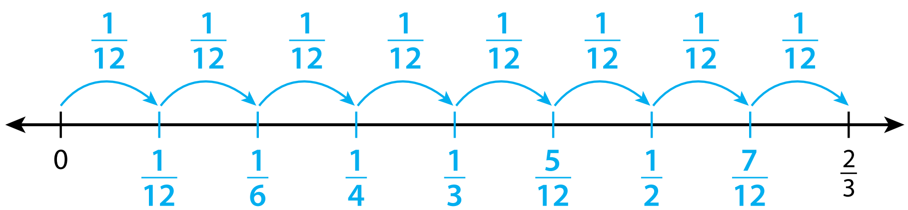


How many $\frac{1}{5}$s make $\frac{14}{10}$? **7**

Complete the equations.

$\frac{14}{10} \div$ **$\frac{1}{5}$** $= 7$ **7** $\cdot \frac{1}{5} = \frac{14}{10}$

2 Use the number line to show $\frac{2}{3} \div \frac{1}{12}$.



What is the quotient? **8**

3 Which type of model do you like better, the bar model or the number line? Explain.

Answers will vary. Possible answer: I like the bar model because it is more visual to me. The boxes seem to represent the fractions in space, whereas the number line is mostly numbers.

Using Multiplication to Divide by a Fraction

Write the missing digits in the boxes to make each equation true.

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

2. $\frac{4}{5} \div \frac{1}{4} = \frac{4}{5} \times \frac{4}{\boxed{1}} = \frac{\boxed{16}}{\boxed{5}}$

3. $\frac{2}{5} \div \frac{3}{4} = \frac{2}{5} \times \frac{\boxed{4}}{\boxed{3}} = \frac{\boxed{8}}{15}$

4. $\frac{5}{6} \div \frac{5}{12} = \frac{5}{6} \times \frac{\boxed{12}}{\boxed{5}} = \frac{\boxed{60}}{30} = 2$

5. $\frac{3}{4} \div \frac{5}{7} = \frac{3}{4} \times \frac{\boxed{7}}{\boxed{5}} = \frac{\boxed{21}}{\boxed{20}}$

6. $1\frac{1}{3} \div \frac{3}{7} = \frac{\boxed{4}}{3} \times \frac{7}{\boxed{3}} = \frac{\boxed{28}}{\boxed{9}}$

7. $4\frac{\boxed{1}}{2} \div \frac{2}{5} = \frac{9}{2} \times \frac{\boxed{5}}{\boxed{2}} = \frac{\boxed{45}}{\boxed{4}}$

8. $3\frac{1}{2} \div \frac{\boxed{7}}{8} = \frac{7}{\boxed{2}} \times \frac{8}{7} = \frac{\boxed{56}}{\boxed{14}} = \boxed{4}$

9. $1\frac{2}{3} \div 2\frac{1}{4} = \frac{\boxed{5}}{3} \times \frac{\boxed{4}}{9} = \frac{\boxed{20}}{\boxed{27}}$

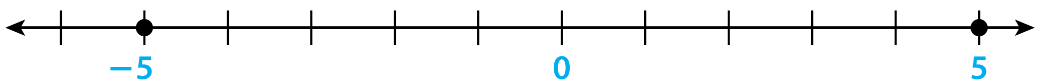
10. $3\frac{3}{5} \div 1\frac{3}{\boxed{4}} = \frac{18}{\boxed{5}} \times \frac{4}{7} = \frac{\boxed{72}}{\boxed{35}}$

11. Write a word problem that could be solved by the equation in problem 8.

    Answers will vary.

Understanding Positive and Negative Numbers

1. The points on the number line are opposite numbers. The tick marks represent intervals of 1 unit.



Label 0 at the correct spot on the number line.

Label the point plotted to the right of 0.

Label the point plotted to the left of 0.

2. Use this list of numbers to answer the following questions:

$0, 4, -2, \frac{2}{3}, -1.8, 16, 3.2, -\frac{5}{4}$

Which numbers are rational numbers that are not integers?

$\frac{2}{3}, -1.8, 3.2, -\frac{5}{4}$

Of the remaining numbers, which are integers but not whole numbers?

-2

Of the remaining numbers, which are whole numbers?

0, 4, 16

3. Use the following terms to complete the following statements: *integers*, *rational numbers,* and *whole numbers*. Use each term only once.

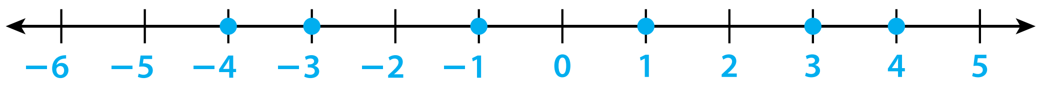
The counting numbers and zero are whole numbers.

The counting numbers and their opposites, along with zero, are integers.

Integers and the decimal equivalents of fractions are rational numbers.

Understanding Positive and Negative Numbers *continued*

4 Plot and label 4, −3, 1, and their opposites on the number line.



5 If several points are graphed on a number line, is the point that is the farthest from 0 always the greatest? Explain.

No; Possible explanation: It depends on whether the number is positive or negative. If it is positive, then it is the greatest number. If it is negative, it is the least number.

Comparing Positive and Negative Numbers

Write $<$ or $>$ to make each comparison true.

1. $7 < 10$
2. $7 > -10$
3. $-7 > -10$
4. $\frac{2}{3} > -1\frac{2}{3}$
5. $-50 < 0.3$
6. $-12 > -35$
7. $-5 < 4.5$
8. $\frac{1}{2} > -80$
9. $-\frac{1}{4} > -1.4$

Write each set of numbers in order from least to greatest.

10. $5, -2, -1, 4$

    $-2, -1, 4, 5$

11. $3.4, 7, -3.5, -3$

    $-3.5, -3, 3.4, 7$

12. $-2.1, -2, -3, 0$

    $-3, -2.1, -2, 0$

13. $-\frac{3}{4}, -2, -\frac{1}{4}, 2$

    $-2, -\frac{3}{4}, -\frac{1}{4}, 2$

14. $5, 0, -6, -0.1$

    $-6, -0.1, 0, 5$

15. $7.5, -200, -1.5, -8$

    $-200, -8, -1.5, 7.5$

16. $\frac{1}{2}, -\frac{1}{2}, -\frac{1}{3}, \frac{1}{3}$

    $-\frac{1}{2}, -\frac{1}{3}, \frac{1}{3}, \frac{1}{2}$

17. $1.2, -2.1, -21, 0.12$

    $-21, -2.1, 0.12, 1.2$

18. $0.1, -0.2, 0.55, -0.31$

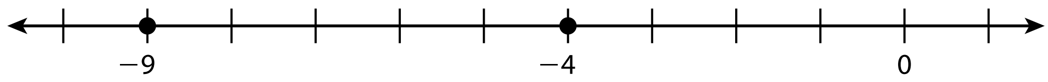
    $-0.31, -0.2, 0.1, 0.55$

19. Describe how to determine which of two negative numbers is greater. Give an example.

    Possible answer: On a horizontal number line, the number to the right is greater. For example, -10 is to the right of -30 on a number line, so -10 is greater than -30.

Understanding Absolute Value

1 Answer the questions about this number line.



Which is greater, −9 or −4? Explain.

−4; Possible explanation: −4 is to the right of −9 on the number line, so it is greater than −9.

Which is greater, |−9| or |−4|? Explain.

|−9|; Possible explanation: Absolute value is the distance from 0 on the number line. −9 is farther from 0 than −4, so |−9| is greater than |−4|.

2 A football team tries to move the ball forward as many yards as possible on each play, but sometimes they end up behind where they started. The distances, in yards, that a team moves on its first five plays are 2, −1, 4, 3, and −5. A positive number indicates moving the ball forward, and a negative number indicates moving the ball backward.

Which number in the list is the greatest?

4

What is a better question to ask to find out which play went the farthest from where the team started?

Possible answer: Which number has the greatest absolute value?

The coach considers any play that moves the team more than 4 yards from where they started a "big play." Which play(s) are big plays?

The play that moved the team −5 yards is a big play.

3 When does it make sense to compare the absolute values of numbers rather than the numbers themselves?

Possible answer: If a problem deals with distance, then it makes more sense to compare absolute values. If a problem deals with value, then it makes more sense to compare the numbers.

Understanding the Four-Quadrant Coordinate Plane

➤ **For problems 1–6, plot and label each point in the coordinate plane. Name the quadrant or axis where the point is located.**

1. $A(-3, -2)$
   Quadrant III

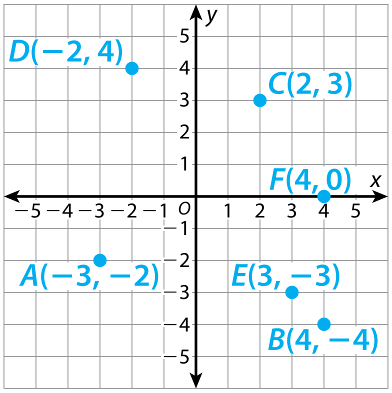
2. $B(4, -4)$
   Quadrant IV

3. $C(2, 3)$
   Quadrant I

4. $D(-2, 4)$
   Quadrant II

5. $E(3, -3)$
   Quadrant IV

6. $F(4, 0)$
   x-axis



7. If point E above is reflected across the x-axis, what would be the coordinates of the reflection? Explain.
   (3, 3); Possible explanation: Point E is 3 units to the right of the y-axis and 3 units below the x-axis. Its reflection is also 3 units to the right of the y-axis and is 3 units above the x-axis. That is the location of (3, 3).

8. Imagine that one of the points given in problems 1–6 has been reflected. The reflection is in Quadrant II. What are the possible coordinates of the reflected point? Explain.
   $(-2, 3)$ or $(-3, 2)$; Possible explanation: For the point to be in Quadrant II, it must either be a reflection of point A across the x-axis or a reflection of point C across the y-axis. If it is a reflection of point A across the x-axis, then the x-coordinate is the same as and the y-coordinate is the opposite of point A. If it is a reflection of point C across the y-axis, then the x-coordinate is the opposite of and the y-coordinate is the same as point C.

9. Bradley says that if point B is reflected across the y-axis and its reflection is then reflected across the x-axis, the result is point D. Is Bradley correct? Explain.
   Bradley is not correct. Possible explanation: When point B is reflected across the y-axis, the coordinates of the reflection are $(-4, -4)$. When $(-4, -4)$ is reflected across the x-axis, the coordinates of the reflection are $(-4, 4)$. The coordinates of point D are $(-2, 4)$.

Writing and Interpreting Algebraic Expressions

▸ **Write an algebraic expression for each word phrase or situation.**

1. 12 more than 8.2 times a number n

   $8.2n + 12$

2. 3 less than the quotient of 18 and a number m

   $\frac{18}{m} - 3$

3. 5.6 times the sum of 4 and a number p

   $5.6(4 + p)$

4. the quotient of 2 and a number x, times 3

   $\frac{2}{x} \times 3$

5. Five friends split the cost of parking at an amusement park. Each of them also buys a $30 ticket. Write an algebraic expression that represents the amount of money each friend spends. Identify any variables.

   p = total cost of parking;

   $\frac{1}{5}p + 30$ or $\frac{p}{5} + 30$

6. A movie theater is open x hours Monday through Thursday and y hours Friday through Sunday. Write an algebraic expression that represents the number of hours per week the theater is open.

   $4x + 3y$

▸ **Interpret the meaning of the algebraic expression in each problem.**

7. Andrew writes the algebraic expression $2s + 2.79$ to represent the cost of his lunch. He bought 2 sandwiches and a large drink. Identify any variables, coefficients, and terms in the expression. Tell what each represents.

   Variable: s represents the price of each sandwich

   Coefficient: 2 represents the number of sandwiches

   Terms: $2s$ represents the total cost of sandwiches; 2.79 represents the cost of the large drink

Writing and Interpreting Algebraic Expressions *continued*

8 A teacher writes the algebraic expression $24c + 5m + 19.99$ to represent the cost of supplies she purchased for her classroom. She bought 24 packages of colored pencils, 5 packages of markers, and a beanbag chair. Identify any variables, coefficients, and terms in the expression. Tell what each represents.

Variables: *c* represents the price of each package of colored pencils; *m* represents the price of each package of markers

Coefficients: 24 represents the number of packages of colored pencils; 5 represents the number of packages of markers

Terms: 24*c* represents the total cost of colored pencils; 5*m* represents the total cost of markers; 19.99 represents the cost of the beanbag chair

9 Write a situation that could be represented by the algebraic expression $3s + 2.15$.

Possible answer: Logan buys 3 sandwiches for *s* dollars each and a bottled water for $2.15.

Teacher Packet

Evaluating Algebraic Expressions

Check each answer to see whether the student evaluated the expression correctly. If the answer is incorrect, cross out the answer and write the correct answer.

Algebraic Expressions	Student Answers	
1 $5m + 26$ when $m = 3$	~~$5(3) + 26 = 15 + 26 = 31$~~	Possible answer: $5(3) + 26 = 15 + 26 = 41$
2 $8(x + 2)$ when $x = 6$	~~$8(6 + 2) = 48 + 2 = 50$~~	**Possible answer:** $8(6 + 2) = 8(8) = 64$
3 $7p + 5$ when $p = 12$	~~$7(12) + 5 = 7(17) = 119$~~	**Possible answer:** $7(12) + 5 = 84 + 5 = 89$
4 $q + 9p$ when $q = 18$ and $p = 4$	$18 + 9(4) = 18 + 36 = 54$	
5 $6w - 19 + k$ when $w = 8$ and $k = 2$	~~$6(2) - 19 + 8 = 12 - 19 + 8 = 1$~~	**Possible answer:** $6(8) - 19 + 2 = 48 - 19 + 2 = 31$
6 $12x + y$ when $x = 3$ and $y = 52$	$12(3) + 52 = 36 + 52 = 88$	

7 Check your answer to problem 2 by using a different strategy.

Possible work: $8(6 + 2) = 8(6) + 8(2) = 48 + 16 = 64$

Using Order of Operations with Expressions with Exponents

➤ **Simplify or evaluate each exponential expression using the order of operations. The answers are mixed up at the bottom of the page. Cross out the answers as you complete the problems.**

1. $(6 + 3)^4$

   6,561

2. $6 + 3^4$

   87

3. $2(4^3) - 1$

   127

4. $2(4^3 - 1)$

   126

5. $5 + 9(1 + 2)^2$

   86

6. $5 + 9(1) + 2^2$

   18

7. $(18 - 4)^2$

   196

8. $18 - 4^2$

   2

9. $9 + 2(3^2)$

   27

10. $(9 + 2)3^2$

    99

11. $12 + x^4 - 6$ when $x = 8$

    4,102

12. $m^3 + 9n$ when $m = 4$ and $n = 5$

    109

Answers

27	196	2	18	126	99
127	86	109	4,102	87	6,561

Identifying Equivalent Expressions

Determine whether each pair of expressions is equivalent. Show your work.

1. $2(x - y)$ and $2x - 2y$

Yes

Possible work:

$2(x - y)$

$2 \cdot x - 2 \cdot y$

$2x - 2y$

$2x - 2y = 2x - 2y$

2. $4(x + y)$ and $4y + 4x$

Yes

Possible work:

$4(x + y)$

$4 \cdot x + 4 \cdot y$

$4x + 4y$

$4x + 4y = 4y + 4x$

3. $4p + 3c$ and $(c + 2p)(2)$

No

Possible work:

$(c + 2p)(2)$

$2 \cdot c + 2 \cdot 2p$

$2c + 4p$

$4p + 3c \neq 2c + 4p$

4. $21q - 7p$ and $(3q - p)(7)$

Yes

Possible work:

$(3q - p)(7)$

$3q \cdot 7 - p \cdot 7$

$21q - 7p$

$21q - 7p = 21q - 7p$

5. $4(2a - 3v)$ and $8a + 6v$

No

Possible work:

$4(2a - 3v)$

$4 \cdot 2a - 4 \cdot 3v$

$8a - 12v$

$8a - 12v \neq 8a + 6v$

6. $8(3x + c) - 1$ and $8c + 24x - 1$

Yes

Possible work:

$8(3x + c) - 1$

$8 \cdot 3x + 8 \cdot c - 1$

$24x + 8c - 1$

$24x + 8c - 1 = 8c + 24x - 1$

Identifying Equivalent Expressions *continued*

7 $3(2x + 11)$ and $(3x + 15)(2)$

No

Possible work:

$3(2x + 11)$	$(3x + 15)(2)$
$3 \cdot 2x + 3 \cdot 11$	$2 \cdot 3x + 2 \cdot 15$
$6x + 33$	$6x + 30$

$6x + 33 \neq 6x + 30$

8 $2x + 2x + 2c + 6$ and $(2x + c + 3)(2)$

Yes

Possible work:

$2x + 2x + 2c + 6$	$(2x + c + 3)(2)$
$(2x + 2x) + 2c + 6$	$2x \cdot 2 + c \cdot 2 + 3 \cdot 2$
$4x + 2c + 6$	$4x + 2c + 6$

$4x + 2c + 6 = 4x + 2c + 6$

9 $3e + 7 - e$ and $2e + 10 + 2e - 3$

No

Possible work:

$3e + 7 - e$	$2e + 10 + 2e - 3$
$(3e - e) + 7$	$(2e + 2e) + (10 - 3)$
$2e + 7$	$4e + 7$

$2e + 7 \neq 4e + 7$

10 $5c + 4c + 2$ and $5c + 2(2c + 1)$

Yes

Possible work:

$5c + 4c + 2$	$5c + 2(2c + 1)$
$(5c + 4c) + 2$	$5c + 4c + 2$
$9c + 2$	$9c + 2$

$5c + 4c + 2 = 5c + 2(2c + 1)$

11 How can you check your answer to problem 8 by choosing values for the variables?

Possible answer: I can choose values for *x* and *c*, substitute them into each expression, and compare the results. If the values are equal, the expressions are equivalent.

Writing and Solving One-Variable Equations

Solve each problem by writing and solving a one-variable equation.

1. In the first three innings of a baseball game, the home team scored some runs. In the rest of the game, they scored 5 runs more than the number of runs scored in the first three innings. If the home team scored 9 runs in all, how many runs did they score during the first three innings? How many runs did they score in the remainder of the game? Let x = the runs scored in the first three innings.

   Possible work: $x + (x + 5) = 9$

   $2x + 5 = 9$

   $2x = 4$

   $x = 2$

   The team scored 2 runs in the first three innings, and 2 + 5, or 7, runs in the remainder of the game.

2. The punch bowl at Felicia's party is getting low, so she adds 12 cups of punch to the bowl. Two guests serve themselves 1.25 cups and 2 cups of punch. The punch bowl now contains 11.5 cups of punch. How many cups were in the punch bowl before Felicia refilled it? Let n = number of cups in bowl before Felicia refilled it.

   Possible work: $n + 12 - 1.25 - 2 = 11.5$

   $n + 8.75 = 11.5$

   $n = 2.75$

   There were 2.75 cups of punch in the bowl before Felicia refilled it.

3. Vanessa is a caterer. She made several batches of appetizers last weekend for an event. This weekend, Vanessa made 4 times as many batches. She made a total of 25 batches of appetizers for the two weekends. Determine the number of batches Vanessa made last weekend and the number of batches she made this weekend. Let b = the number of batches of appetizers Vanessa made last weekend.

   Possible work: $b + 4b = 25$

   $5b = 25$

   $b = 5$

   Vanessa made 5 batches of appetizers last weekend and 20 batches this weekend.

Writing and Solving One-Variable Equations *continued*

4 Wanda earned \$350 babysitting over the months of July and August. She earned \$90 more in August than in July. How much did she earn babysitting in July? In August?

Possible work: x = money earned in July

$$x + x + 90 = 350$$
$$2x + 90 = 350$$
$$2x = 260$$
$$x = 130$$

Wanda earned \$130 in July and 130 + 90, or \$220, in August.

5 Charlene is 8 years older than Aaron. The sum of their ages is 44. What are their ages?

Possible work: a = Aaron's age

$$a + (a + 8) = 44$$
$$2a + 8 = 44$$
$$2a = 36$$
$$a = 18$$

Aaron is 18 years old, and Charlene is 26 years old.

6 On Saturday, 45% of the music Brianna listened to was country songs. She listened to 27 country songs on Saturday. How many songs did Brianna listen to on Saturday?

Possible work: n = total number of songs

45% of the songs are country.

$$0.45 \cdot n = 27$$
$$n = 60$$

Brianna listened to 60 songs on Saturday.

Writing and Graphing One-Variable Inequalities

Write an inequality to represent each situation.

1. A farmer weighs a dozen chicken eggs. The heaviest egg is 56 g.

   $e \leq 56$

2. A light bulb is programmed to turn on when the temperature in a terrarium is 72°F or cooler.

   $t \leq 72$

3. Martin is building a sandcastle at the beach. He pours no less than 5 cups of wet sand into each plastic mold.

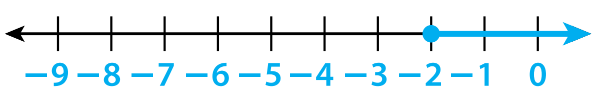
   $s \geq 5$

4. The shortest tree in a park is at least 25.5 ft tall.

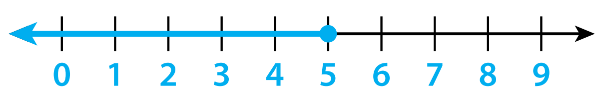
   $h \geq 25.5$

Graph each inequality. Possible answers given.

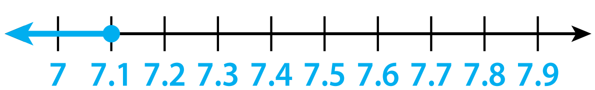
5. $n \geq -2$



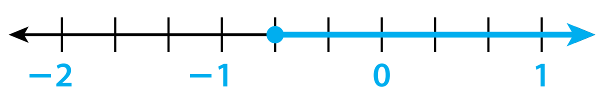
6. $h \leq 5$



7. $t \leq 7.1$



8. $r \geq -\frac{2}{3}$



9. What is the difference between the inequality $x \leq 5$ and the equation $x = 5$?

   Possible answer: The inequality $x \leq 5$ describes a range of numbers. The graph of the inequality includes a closed point at 5 and an arrow pointing left to show the range of numbers. The equation $x = 5$ describes only one number. The graph of the equation is a single closed point at 5.