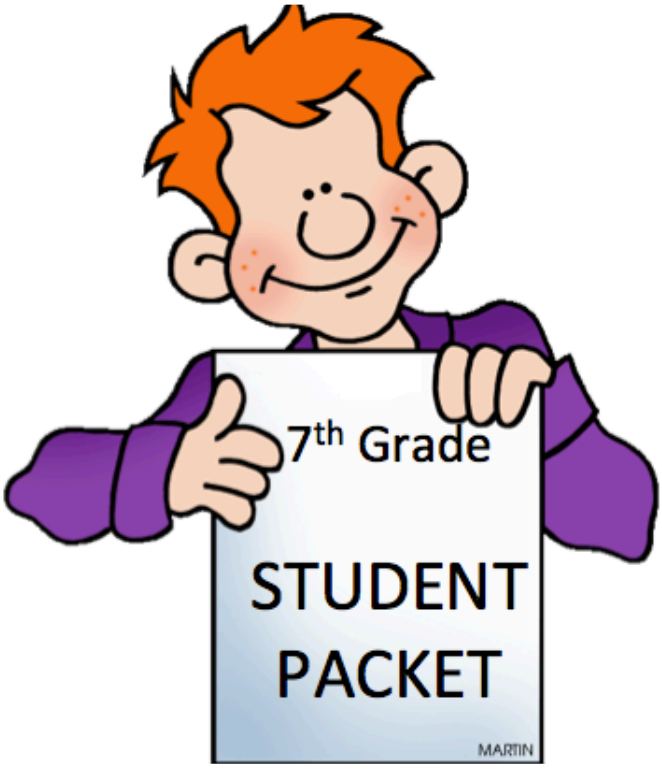
7th Grade Intensive Math



Name _____ Date _____ Class _____

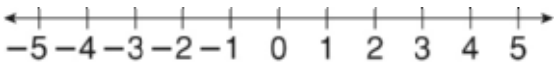
LESSON 2-1

Practice A

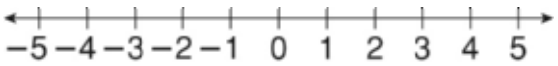
Integers

Graph each integer and its opposite on a number line.

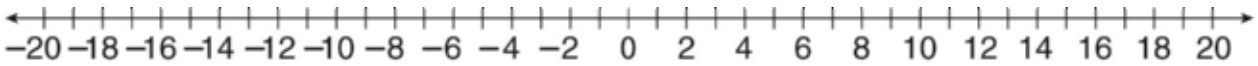
1. 3



2. –5



Use the number line to compare the integers. Write < or >.



3. –8 ___ 7

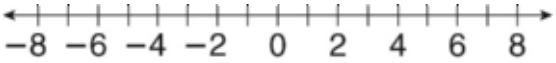
4. 4 ___ –7

5. –6 ___ –16

6. –11 ___ 11

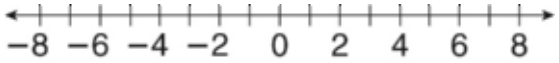
Graph the integers on a number line. Then write them in order from least to greatest.

7. –6; 3; –5; 8



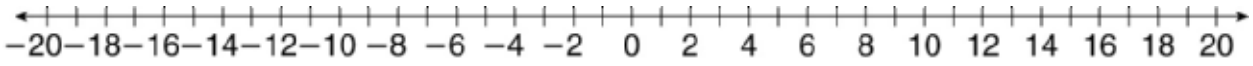
_____

8. 6; –7; –8; 0



_____

Use a number line to find each absolute value.



9. $|-6|$ _____

10. $|2|$ _____

11. $|-1|$ _____

12. $|8|$ _____

13. $|-9|$ _____

14. $|3|$ _____

15. $|-4|$ _____

16. $|10|$ _____

17. $|-15|$ _____

18. $|20|$ _____

19. $|-13|$ _____

20. $|17|$ _____

21. The windchill on a cold day made it feel like 5 degrees below zero outside. Write this temperature as an integer.

_____

22. A baby gained 15 pounds from birth to his first birthday. Write this amount as an integer.

_____

Name _____ Date _____ Class _____

LESSON 2-1

Reading Strategies

Use a Graphic Organizer

Integers

Definition	**Facts**
The set of whole numbers and their opposites	• Each number can be paired with its opposite. The opposite of 2 is –2. The opposite of –3 is 3. • Zero is its own opposite.
Examples	**Non-examples**
0, 2, 5, 9, 13, –3, –7, –12, –17	$\frac{2}{3}$, $\frac{11}{5}$, $2\frac{5}{8}$, 0.5, 0.23, 1.05, 3.61

Answer each question.

1. What are integers?

   _____

2. Write the opposite of 6. _____
3. Write the opposite of 10. _____
4. Write the opposite of 0. _____
5. Write the opposite of –8. _____
6. Write the opposite of –3. _____

Write "integer" or "not an integer" for the following numbers.

7. –9 _____
8. $\frac{5}{7}$ _____
9. 0.1 _____
10. 42 _____

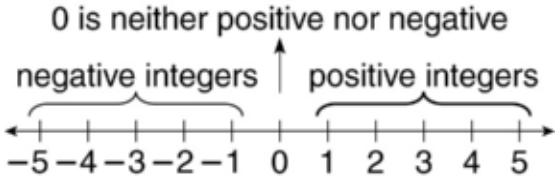
Name _____ Date _____ Class _____

LESSON 2-1

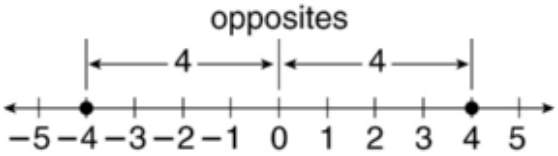
Review for Mastery

Integers

This number line shows integers.



Every integer has an **opposite** integer. A number and its opposite are the same distance from 0.



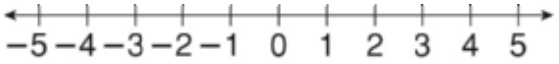
1. How many units is 4 from 0? _____

2. How many units is –4 from 0? _____

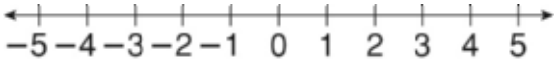
3. 4 and –4 are called _____.

Graph each integer and its opposite on a number line.

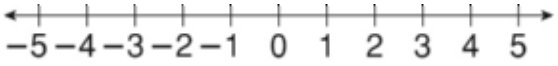
4. 2



5. –3



You can use a number line to compare and order numbers. The numbers get greater as you move to the right on the number line.



6. What is the order from least to greatest of –1, 2, and –3? _____

Write the integers in order from least to greatest.

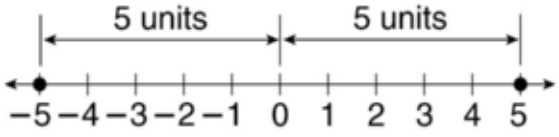
7. –2; –6; 4

_____

8. –3; 7; 1

_____

The absolute value of an integer is its distance from 0 on a number line. –5 is 5 units from 0. The absolute value of –5 is 5. You write $|-5| = 5$.



9. How many units from 0 is –3? _____

Integers

Steps for Success

Step I In order to introduce the concept of integers, direct students to the photo in the lesson opener.

- Explain that if the surface of the water is zero, then a negative number represents the location of someone beneath the water surface, such as a diver. A positive number represents the location of someone above the water surface, such as a lifeguard in a chair.
- Discuss the concept of elevation. Explain that at sea level the elevation is zero. Locations above sea level are represented with positive numbers, and locations below sea level are represented with negative numbers. Ask students if they know the elevation of their city with respect to sea level.

Step II Ask the students to complete the worksheet.

- Problem 1 on the worksheet supports the lesson opener.
- Problem 2 on the worksheet supports Example 1A in the student textbook. Ask students to explain the word *opposite.* Make a list on the board of common opposite words: open/close, up/down, in/out, forward/backward.
- Problem 3 on the worksheet supports Example 4 in the student textbook.

Step III Teach the lesson. Assess students' understanding of the lesson by referring them to the Think and Discuss exercises.

Making Connections

- Ask students to describe real-world examples of how integers are used, such as in temperature, golf scores, and elevation.
- Take a field trip to the school football field, or create a field in your school's green space with yard-line markings. Pair up students. Position one student at the 50-yard line. Have the other student call out a loss or gain of yardage. The student on the field then has to move according to the loss or the gain.
- Verify that students understand that opposites are equidistant from zero by having them count with their fingers the distance from zero to each number.
- Have students create a number line for the classroom. Use the number line to physically show distances from zero to a given integer. This can also be used to explain opposites, ordering integers, and absolute value.
- Have students research the elevation of the five largest cities closest to their hometown.

Name _____ Date _____ Class _____

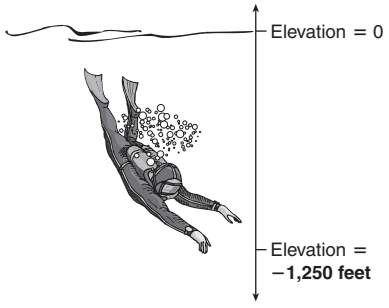
LESSON 2-1

Student Worksheet

Integers

Problem 1

An **integer** is a positive or negative whole number.
A positive number is a number greater than zero.
A negative number is a number less than zero.



Sylvia Earle dove to an elevation of –1,250 feet.

Problem3

A number's **absolute value** is its distance from 0 on a number line.

Think and Discuss

1. What is the absolute value of 2?

_____

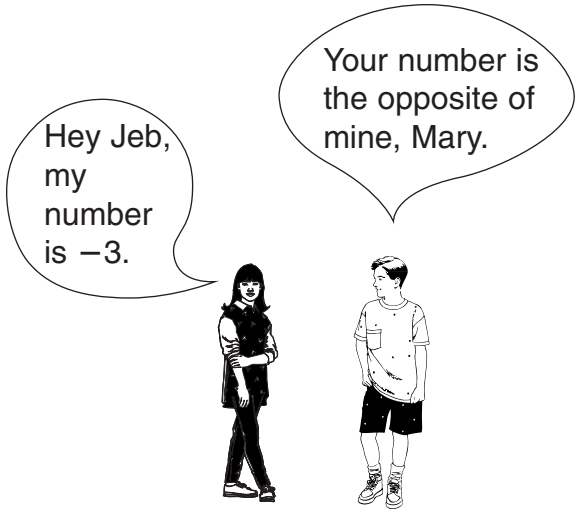
2. What is the absolute value of −2?

_____

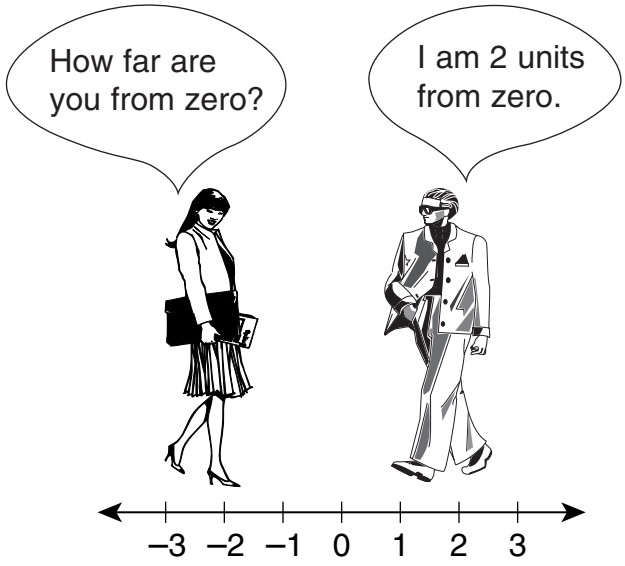
3. Name two integers that have the same absolute value.

_____

Problem 2



Jeb's number is 3.



2-1 Exercises

Homework Help THINK central
Go to thinkcentral.com
Exercises 1–30, 31, 33, 35, 37, 39, 41, 45

MA.7.A.3.1

GUIDED PRACTICE

See Example 1 **Graph each integer and its opposite on a number line.**

1. 2 **2.** −9 **3.** −1 **4.** 6

See Example 2 **Compare the integers. Use < or >.**

5. 5 ▢ −5 **6.** −9 ▢ −18 **7.** −21 ▢ −17 **8.** −12 ▢ 12

See Example 3 **Use a number line to order the integers from least to greatest.**

9. 6, −3, −1, −5, 4 **10.** 8, −2, 7, 1, −8 **11.** −6, −4, 3, 0, 1

See Example 4 **Use a number line to find each absolute value.**

12. |−2| **13.** |8| **14.** |−7| **15.** |−10|

INDEPENDENT PRACTICE

See Example 1 **Graph each integer and its opposite on a number line.**

16. −4 **17.** 10 **18.** −12 **19.** 7

See Example 2 **Compare the integers. Use < or >.**

20. −14 ▢ −7 **21.** 9 ▢ −9 **22.** −12 ▢ 12 **23.** −31 ▢ −27

See Example 3 **Use a number line to order the integers from least to greatest.**

24. −3, 2, −5, −6, 5 **25.** −7, −9, −2, 0, −5 **26.** 3, −6, 9, −1, −2

See Example 4 **Use a number line to find each absolute value.**

27. |−16| **28.** |12| **29.** |−20| **30.** |15|

PRACTICE AND PROBLEM SOLVING

Compare. Write <, >, or =.

31. −25 ▢ 25 **32.** 18 ▢ −55 **33.** |−21| ▢ 21 **34.** −9 ▢ −27

35. 34 ▢ |34| **36.** 64 ▢ |−75| **37.** |−3| ▢ |3| **38.** −100 ▢ −82

39. Earth Science The table shows the average temperatures in Vostok, Antarctica from March to October. List the months in order from coldest to warmest.

Month	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Temperature (°F)	−72	−84	−86	−85	−88	−90	−87	−71

40. What is the opposite of |32|? **41.** What is the opposite of |−29|?

42. Business A company reported a net loss of $2,000,000 during its first year. In its second year it reported a profit of $5,000,000. Write each amount as an integer.

○ = WORKED-OUT SOLUTIONS on p. WS3

Sports

In wakeboarding, a rider uses the waves created by a boat, the wake, to jump into the air and perform tricks such as rolls and flips.

43. Critical Thinking Give an example in which a negative number has a greater absolute value than a positive number.

44. Social Studies Lines of latitude are imaginary lines that circle the globe in an east-west direction. They measure distances north and south of the equator. The equator represents 0° latitude.

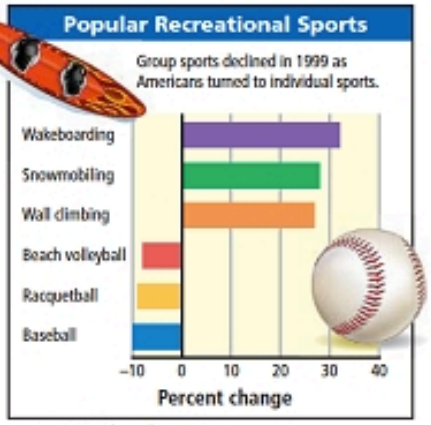
a. What latitude is opposite of 30° north latitude?

b. How do these latitudes' distances from the equator compare?

Sports The graph shows how participation in several sports changed between 1999 and 2000 in the United States.

45. By about what percent did participation in racquetball increase or decrease?

46. By about what percent did participation in wall climbing increase or decrease?



Source: *USA Today*, July 6, 2001

47. What's the Error? At 9 A.M. the outside temperature was −3 °F. By noon, the temperature was −12 °F. A newscaster said that it was getting warmer outside. Why is this incorrect?

48. Write About It Explain how to compare two integers.

49. Challenge What values can x have if $|x| = 11$?

Florida Spiral Review

MA.7.A.3.1, MA.7.A.3.3

50. Multiple Choice Which list shows the values in order from least to greatest?

A. $|-5|, |-3|, |-4|, |2|$

B. $|2|, |-3|, |-4|, |-5|$

C. $|-3|, |2|, |-4|, |-5|$

D. $|-5|, |-4|, |-3|, |2|$

51. Multiple Choice Which number is NOT equivalent to the others?

F. -10 **G.** $|-10|$ **H.** $|10|$ **I.** 10

Simplify each expression. Use the order of operations to justify your answer. (Lesson 1-2)

52. $(4 \cdot 9) - (9-3)^2$ **53.** $5 + 9 \cdot 2^2 \div 6$ **54.** $6{,}842 - (5^3 \cdot 5 \cdot 10)$

Solve each equation. Check your answer. (Lessons 1-8, 1-9)

55. $n - 22 = 16$ **56.** $y + 27 = 42$ **57.** $\frac{m}{36} = 12$ **58.** $144 = 3p$

Name _____ Date _____ Class_____

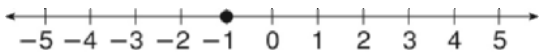
LESSON 2-2

Practice A

Adding Integers

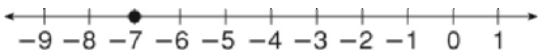
Show the addition on the number line. Then write the sum.

1. $2 + (-3)$



_____

2. $-3 + (-4)$



_____

Find each sum.

3. $-4 + (-9)$ _____
4. $7 + (-8)$ _____
5. $-2 + 1$ _____
6. $6 + (-9)$ _____
7. $5 + 7$ _____
8. $9 + (-5)$ _____
9. $(-1) + 9$ _____
10. $-9 + (-7)$ _____
11. $2 + (-7)$ _____
12. $-6 + (-4)$ _____
13. $3 + 2$ _____
14. $-2 + 6$ _____

Evaluate $e + f$ for the given values.

15. $e = 9, f = -2$ _____
16. $e = -4, f = -6$ _____
17. $e = 6, f = -1$ _____
18. $e = -3, f = 2$ _____
19. $e = 8, f = -6$ _____
20. $e = -2, f = -3$ _____

21. The temperature dropped 13 °F in 7 hours. The final temperature was –2 °F. What was the starting temperature?

_____

22. A football team gains 8 yards in one play, then loses 5 yards in the next. How many yards did the team gain in these two plays?

_____

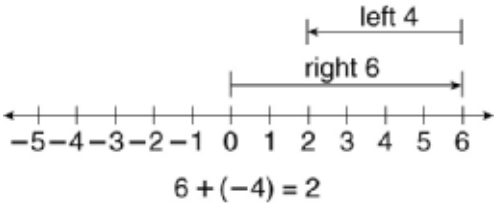
Name _____ Date _____ Class _____

LESSON 2-2

Reading Strategies

Use Graphic Aids

Randy's football team had the ball on the zero yard line. On their first play they gained six yards. On the second play they lost four yards. On what yard line is the ball now?



$6 + (-4) = 2$

Use the number line to help you answer the questions.

1. On which number do you begin? _____

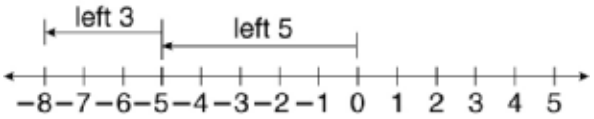
2. Which direction do you move first? How many places do you move?

   _____

3. Which direction do you move next? How many places do you move?

   _____

When Angela went to bed, the temperature was zero degrees. When her mother went to bed two hours later, the temperature had gone down 5 degrees. By the time Angela got up the temperature had gone down another 3 degrees. What was the temperature when she got up?



$-5 + (-3) = -8$

Use the number line to help you answer the questions.

4. On which number do you begin? _____

5. Which direction do you move first? How many spaces?

   _____

6. Which direction do you move next? How many spaces?

   _____

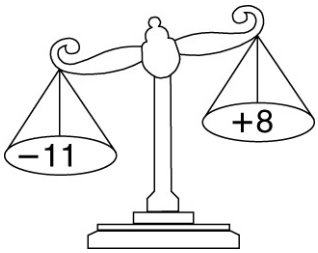
Name _____ Date _____ Class_____

LESSON 2-2

Review for Mastery

Adding Integers

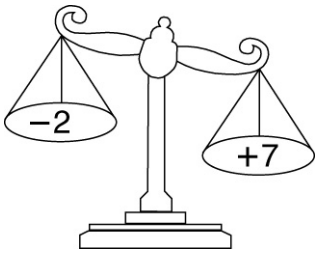
This balance scale "weighs" positive and negative numbers. Negative numbers go on the left of the balance, and positive numbers go on the right.



Find $-11 + 8$.

The scale will tip to the left side because the sum of -11 and $+8$ is negative.

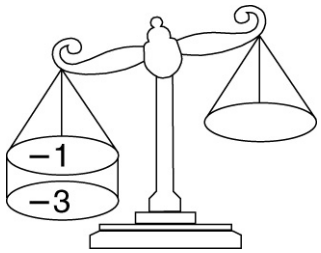
$-11 + 8 = -3$



Find $-2 + 7$.

The scale will tip to the right side because the sum of -2 and $+7$ is positive.

$-2 + 7 = 5$



Find $-1 + (-3)$.

Both -1 and -3 go on the left side. The scale will tip to the left side because the sum of -1 and -3 is negative.

$-1 + (-3) = -4$

Find 3 + (–9).

1. Should you add or subtract? _____
2. Will the sum be positive or negative? _____

$3 + (-9) = -6$

the sign of the integer with the greatest absolute value

$|9| - |3|$

Find –5 + (–8).

3. Should you add or subtract? _____
4. Will the sum be positive or negative? _____
5. $-5 + (-8) =$ _____

Add.

6. $7 + (-3) =$ _____
7. $-2 + (-3) =$ _____
8. $-5 + 4 =$ _____
9. $-3 + (-1) =$ _____
10. $-7 + 9 =$ _____
11. $4 + (-9) =$ _____

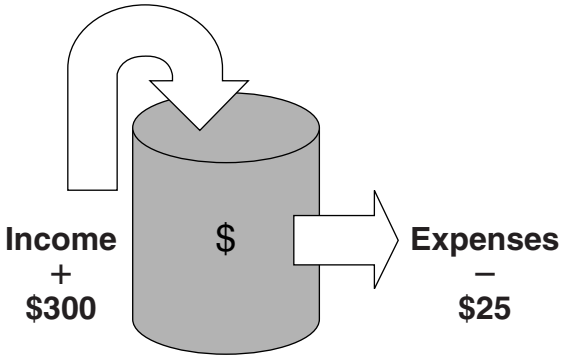
Name _____ Date _____ Class _____

LESSON 2-2

Student Worksheet

Adding Integers

Problem 1

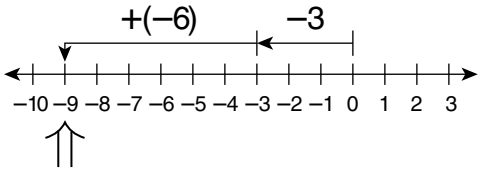


The club has an income of $300 and expenses of $25.

Problem 2

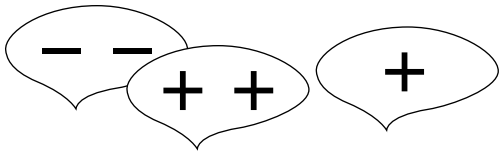
What is $-3 + (-6)$?

Start at 0. For -3 move 3 units left. For $+(-6)$ move 6 units left.



You land at -9.

Problem 3



SAME SIGNS ⟶ SUM

$7 + 4 = 11$

or

$-7 + (-4) = -11$

DIFFERENT SIGNS ⟶ DIFFERENCE

$8 + (-6) = -2$

or

$-8 + 6 = -2$

Think and Discuss

1. Does the expression $-3 + 5$, have same signs or different signs?

_____

2. If the signs are the same, do you add or subtract? _____

3. In Problem 2, do you add or subtract? What is the answer? _____

2-2 Exercises

Homework Help — THINK central
Go to thinkcentral.com
Exercises 1–32, 33, 37, 39, 43, 47, 49, 51

MA.7.A.3.1
MA.7.A.3.2

GUIDED PRACTICE

See Example 1 — **Use a number line to find each sum.**

1. $9 + 3$
2. $-4 + (-2)$
3. $7 + (-9)$
4. $-3 + 6$

See Example 2 — **Find each sum.**

5. $7 + 8$
6. $-1 + (-12)$
7. $-25 + 10$
8. $31 + (-20)$

See Example 3 — **Evaluate $a + b$ for the given values.**

9. $a = 5, b = -17$
10. $a = 8, b = -8$
11. $a = -4, b = -16$

See Example 4

12. **Sports** A football team gains 8 yards on one play and then loses 13 yards on the next. Use integer addition to find the team's total yardage.

INDEPENDENT PRACTICE

See Example 1 — **Use a number line to find each sum.**

13. $-16 + 7$
14. $-5 + (-1)$
15. $4 + 9$
16. $-7 + 8$
17. $10 + (-3)$
18. $-20 + 2$
19. $-12 + (-5)$
20. $-9 + 6$

See Example 2 — **Find each sum.**

21. $-13 + (-6)$
22. $14 + 25$
23. $-22 + 6$
24. $35 + (-50)$
25. $-81 + (-7)$
26. $28 + (-3)$
27. $-70 + 15$
28. $-18 + (-62)$

See Example 3 — **Evaluate $c + d$ for the given values.**

29. $c = 6, d = -20$
30. $c = -8, d = -21$
31. $c = -45, d = 32$

See Example 4

32. The temperature dropped 17 °F in 6 hours. The final temperature was −3 °F. Use integer addition to find the starting temperature.

PRACTICE AND PROBLEM SOLVING

Find each sum.

33. $-8 + (-5)$
34. $14 + (-7)$
35. $-41 + 15$
36. $-22 + (-18) + 22$
37. $27 + (-29) + 16$
38. $-30 + 71 + (-70)$

Compare. Write <, >, or =.

39. $-23 + 18 \square -41$
40. $59 + (-59) \square 0$
41. $31 + (-20) \square 9$
42. $-24 + (-24) \square 48$
43. $25 + (-70) \square -95$
44. $16 + (-40) \square -24$

45. **Personal Finance** Cody made deposits of $45, $18, and $27 into his checking account. He then wrote checks for $21 and $93. Write an expression to show the change in Cody's account. Then simplify the expression.

○ = WORKED-OUT SOLUTIONS on p. WS3

Evaluate each expression for $w = -12$, $x = 10$, and $y = -7$.

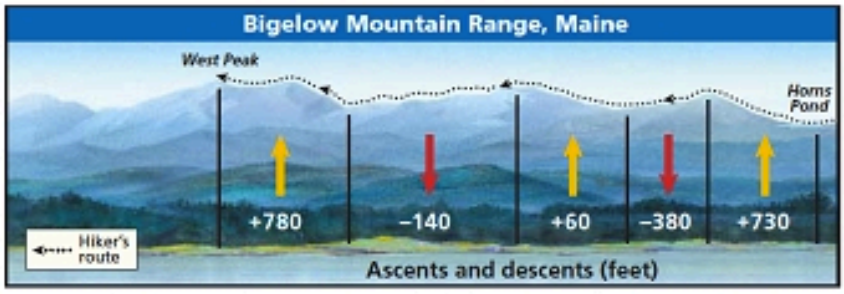
46. $7 + y$ **47.** $-4 + w$ **48.** $w + y$ **49.** $x + y$ **50.** $w + x$

LINK

Recreation

The Appalachian Trail extends about 2,160 miles from Maine to Georgia. It takes about 5 to 7 months to hike the entire trail.

51. Recreation Hikers along the Appalachian Trail camped overnight at Horns Pond, at an elevation of 3,100 ft. Then they hiked along the ridge of the Bigelow Mountains to West Peak, which is one of Maine's highest peaks. Use the diagram to determine the elevation of West Peak.



52. Multi-Step Hector and Luis are playing a game. In the game, each player starts with 0 points, and the player with the most points at the end wins. Hector gains 5 points, loses 3, loses 2, and then gains 3. Luis loses 5 points, gains 1, gains 5, and then loses 3. Determine the final scores by modeling the problem on a number line. Then tell who wins the game and by how much.

53. What's the Question? The temperature was −8 °F at 6 A.M. and rose 15 °F by 9 A.M. The answer is 7 °F. What is the question?

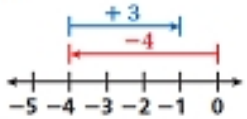
54. Write About It Compare the method used to add integers with the same sign and the method used to add integers with different signs.

55. Challenge A business had losses of $225 million, $75 million, and $375 million and profits of $15 million and $125 million. How much was its overall profit or loss?

Florida Spiral Review

MA.7.A.3.1

56. Multiple Choice Which expression is represented by the model?



A. $-4 + (-1)$ C. $-4 + 3$

B. $-4 + 0$ D. $-4 + 4$

57. Multiple Choice Which expression has the greatest value?

F. $-4 + 8$ G. $-2 + (-3)$ H. $1 + 2$ I. $4 + (-6)$

Simplify each expression. (Lesson 1-2)

58. $2 + 5 \cdot 2 - 3$ **59.** $3^3 - (6 \cdot 4) + 1$ **60.** $30 - 5 \cdot (3 + 2)$ **61.** $15 - 3 \cdot 2^2 + 1$

Compare. Write <, >, or =. (Lesson 2-1)

62. $-14 \square |-12|$ **63.** $|-4| \square 3$ **64.** $|-6| \square 6$ **65.** $|-9| \square -11$

Name _____ Date _____ Class _____

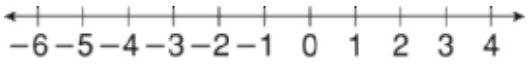
LESSON 2-3

Practice A

Subtracting Integers

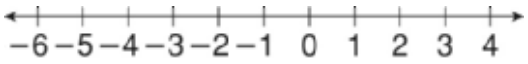
Show the subtraction on the number line. Then write the difference.

1. 3 – 8



_____

2. –5 – (–1)



_____

Find each difference.

3. –3 – 4 _____

4. –7 – (–2) _____

5. 12 – 6 _____

6. 2 – (–7) _____

7. –8 – 8 _____

8. –5 – (–5) _____

9. –1 – (–2) _____

10. 9 – (–3) _____

11. 8 – 1 _____

12. 7 – (–9) _____

13. –3 – 8 _____

14. –3 – (–7) _____

Evaluate $x - y$ for each set of values.

15. $x = 6$, $y = -3$ _____

16. $x = -7$, $y = 1$ _____

17. $x = -2$, $y = -5$ _____

18. $x = 9$, $y = 11$ _____

19. $x = -1$, $y = -1$ _____

20. $x = -5$, $y = 5$ _____

21. The high temperature one day was 6 °F. The low temperature was –3 °F. What was the difference between the high and low temperatures for the day?

_____

22. The temperature changed from –7 °F at 6 A.M. to 7 °F at noon. How much did the temperature increase?

_____

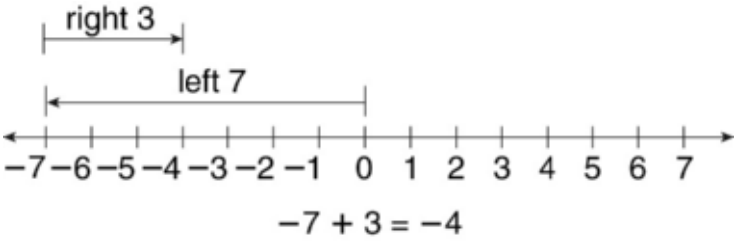
Name _____ Date _____ Class _____

LESSON 2-3

Reading Strategies

Use Graphic Aids

Brett borrowed $7 from his father to buy a CD. He paid back $3. How much money does Brett have now? The number line will help you picture this problem.



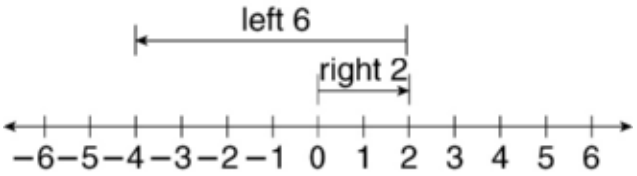
$-7 + 3 = -4$

1. Beginning at 0, in which direction will you move first? _____
2. How many places? _____
3. Which direction do you move next? _____
4. How many places? _____
5. On what number do you end? _____

Bret does not have any money. He owes his dad $4. He has negative $4.

Sally and her friends made up a game with points. You can either win or lose up to ten points on each round of the game. After the first round, Sally's team had 2 points. In the second round they lost 6 points. How many points was Sally's team down by after the second round?

The number line will help you picture the problem.



$2 - 6 = -4$

6. Beginning at zero, which direction will you move first? How many places?

   _____

7. Which direction will you move next? How many places?

   _____

8. By how many points was Sally's team down? _____

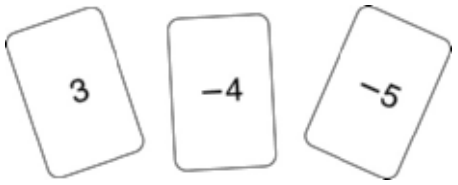
Name _____ Date _____ Class _____

LESSON 2-3

Review for Mastery

Subtracting Integers

The total value of the three cards shown is –6.

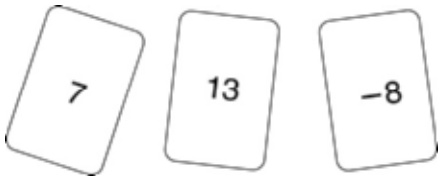


What if you **take away** the 3 card?
Cards –4 and –5 are left.
The new value is –9.
–6 – 3 = –9

What if you **take away** the –4 card?
Cards 3 and –5 are left.
The new value is –2.
–6 – (–4) = –2

Answer each question.

1. Suppose you have the cards shown. The total value of the cards is 12.



   a. What if you take away the 7 card? 12 – 7 = _____

   b. What if you take away the 13 card? 12 – 13 = _____

   c. What if you take away the –8 card? 12 – (–8) = _____

2. Subtract –4 – (–2).

   a. –4 < –2. Will the answer be positive or negative? _____

   b. | 4 | – | 2 | = _____

   c. –4 – (–2) = _____

3. Subtract 21 – 13.

   a. 21 > 13. Will the answer be positive or negative? _____

   b. | 21 | – | 13 | = _____

   c. 21 – 13 = _____

Subtract.

4. 31 – (–9) = _____
5. 15 – 18 = _____
6. –9 – 17 = _____
7. –8 – (–8) = _____
8. 29 – (–2) = _____
9. 13 – 18 = _____

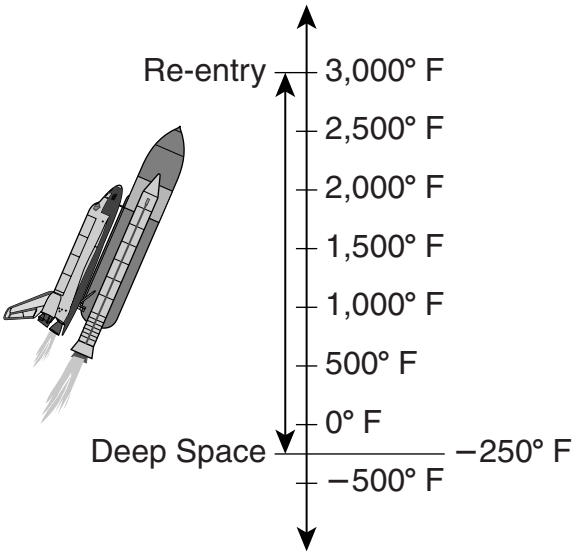
Name _____ Date _____ Class _____

LESSON 2-3

Student Worksheet

Subtracting Integers

Problem 1



Problem 2

— means to **ADD** the opposite.	$5 - 9 = 5 - (+9)$ $= 5 + (-9)$ $= -4$
The opposite of + is −. The opposite of − is +.	$-4 - 3 = -4 + (-3)$ $= -7$

Think and Discuss

1. Why do you add 3,000° and 250° in Problem 1?

_____

_____

2. In Problem 2, what is the opposite of 9? _____

3. Why do you not change the −4 to +4 in Problem 2?

_____

4. Is 3 − 5 the same as 5 − 3? Explain.

_____

2-3 Exercises

Homework Help — THINK central
Go to thinkcentral.com
Exercises 1–35, 39, 41, 43, 45, 47, 51, 53

MA.7.A.3.1
MA.7.A.3.2

GUIDED PRACTICE

See Example 1 — Use a number line to find each difference.

1. $4 - 7$
2. $-6 - 5$
3. $2 - (-4)$
4. $-8 - (-2)$

See Example 2 — Find each difference.

5. $6 - 10$
6. $-3 - (-8)$
7. $-1 - 9$
8. $-12 - (-2)$

See Example 3 — Evaluate $a - b$ for each set of values.

9. $a = 5, b = -2$
10. $a = -8, b = 6$
11. $a = 4, b = 18$

See Example 4

12. In 1980, in Great Falls, Montana, the temperature rose from −32 °F to 15 °F in seven minutes. How much did the temperature increase?

INDEPENDENT PRACTICE

See Example 1 — Use a number line to find each difference.

13. $7 - 12$
14. $-5 - (-9)$
15. $2 - (-6)$
16. $7 - (-8)$
17. $9 - (-3)$
18. $-4 - 10$
19. $8 - (-8)$
20. $-3 - (-3)$

See Example 2 — Find each difference.

21. $-22 - (-5)$
22. $-4 - 21$
23. $27 - 19$
24. $-10 - (-7)$
25. $30 - (-20)$
26. $-15 - 15$
27. $12 - (-6)$
28. $-31 - 15$

See Example 3 — Evaluate $a - b$ for each set of values.

29. $a = 9, b = -7$
30. $a = -11, b = 2$
31. $a = -2, b = 3$
32. $a = 8, b = 19$
33. $a = -10, b = 10$
34. $a = -4, b = -15$

See Example 4

35. In 1918, in Granville, North Dakota, the temperature rose from −33 °F to 50 °F in 12 hours. How much did the temperature increase?

PRACTICE AND PROBLEM SOLVING

Simplify.

36. $2 - 8$
37. $-5 - 9$
38. $15 - 12 - 8$
39. $6 + (-5) - 3$
40. $1 - 8 + (-6)$
41. $4 - (-7) - 9$
42. $(2 - 3) - (5 - 6)$
43. $5 - (-8) - (-3)$
44. $10 - 12 + 2$

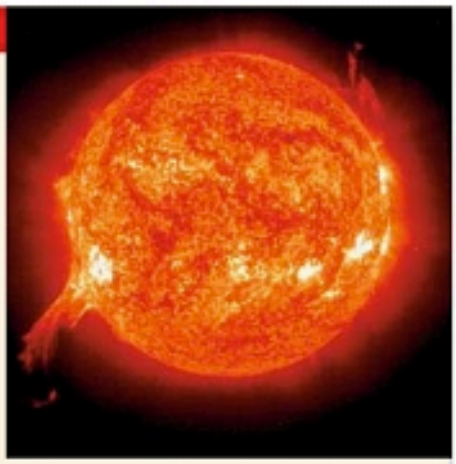
Evaluate each expression for $m = -5$, $n = 8$, and $p = -14$.

45. $m - n + p$
46. $n - m - p$
47. $p - m - n$
48. $m + n - p$

49. **Patterns** Find the next three numbers in the pattern 7, 3, −1, −5, −9, … Then describe the pattern.

○ = WORKED-OUT SOLUTIONS on p. WS3

Astronomy LINK



Temperatures in the Sun range from about 5,500 °C at its surface to more than 15 million °C at its core.

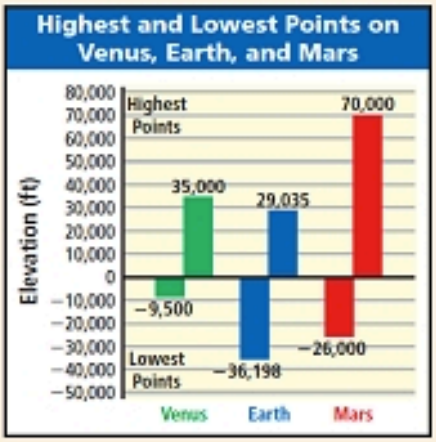
50. The temperature of Mercury can be as high as 873 °F. The temperature of Pluto is about −393 °F. What is the difference between these temperatures?

51. One side of Mercury always faces the Sun. The temperature on this side can reach 873 °F. The temperature on the other side can be as low as −361 °F. What is the difference between the two temperatures?

52. Earth's moon rotates relative to the Sun about once a month. The side facing the Sun at a given time can be as hot as 224 °F. The side away from the Sun can be as cold as −307 °F. What is the difference between these temperatures?

53. The highest recorded temperature on Earth is 136 °F. The lowest is −129 °F. What is the difference between these temperatures?

Use the graph for Exercises 54 and 55.



54. How much deeper is the deepest canyon on Mars than the deepest canyon on Venus?

55. **Challenge** What is the difference between Earth's highest mountain and its deepest ocean canyon? What is the difference between Mars' highest mountain and its deepest canyon? Which difference is greater? How much greater is it?

Florida Spiral Review

MA.7.A.3.1, MA.7.A.3.2

56. Multiple Choice Which expression does NOT have a value of −3?

A. $-2-1$ B. $10-13$ C. $5-(-8)$ D. $-4-(-1)$

57. Extended Response If $m=-2$ and $n=4$, which expression has the least absolute value: $m+n$, $n-m$, or $m-n$? Explain your answer.

Evaluate each expression for the given values of the variables. (Lesson 1-4)

58. $3x-5$ for $x=2$ **59.** $2n^2+n$ for $n=1$ **60.** $4y^2-3y$ for $y=2$

61. $4a+7$ for $a=3$ **62.** x^2+9 for $x=1$ **63.** $5z+z^2$ for $z=3$

64. Sports In three plays, a football team gained 10 yards, lost 22 yards, and gained 15 yards. Use integer addition to find the team's total yardage for the three plays. (Lesson 2-2)

Name _____ Date _____ Class_____

LESSON 2-4

Practice A

Multiplying and Dividing Integers

Find each product.

1. 6 • (–1) _____
2. –4 • 2 _____
3. –3 • (–4) _____
4. –2 • 8 _____
5. 5 • (–7) _____
6. –7 • 9 _____
7. 8 • 4 _____
8. –3 • (–5) _____
9. –5 • (–5) _____
10. 8 • (–4) _____
11. –7 • (–6) _____
12. 9 • (–8) _____
13. 1 • (–7) _____
14. –4 • (–5) _____
15. –6 • 3 _____
16. –7 • (–7) _____

Find each quotient.

17. 12 ÷ (–4) _____
18. –15 ÷ (–3) _____
19. –20 ÷ 5 _____
20. –27 ÷ (–9) _____
21. –45 ÷ (–5) _____
22. –18 ÷ 9 _____
23. 24 ÷ (–4) _____
24. 32 ÷ 4 _____
25. 21 ÷ 3 _____
26. –36 ÷ (–4) _____
27. 16 ÷ (–4) _____
28. –56 ÷ 8 _____
29. –42 ÷ 7 _____
30. –30 ÷ (–6) _____
31. 27 ÷ 9 _____
32. 25 ÷ 0 _____

33. A scientist is measuring the temperature change in a chemical compound. The temperature dropped 11 °F per hour from the original temperature. After 4 hours, the temperature was 90 °F. Find the compound's original temperature.

_____

34. A mountain climber ascends 800 feet per hour from his original position. After 6 hours, his final position is 11,600 feet above sea level. Find the climber's original position.

_____

Name _____ Date _____ Class _____

LESSON 2-4

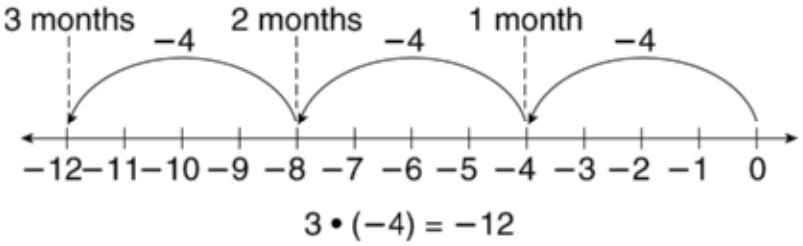
Reading Strategies

Use Graphic Aids

The opposite of 5 is negative 5. Owing money is the opposite of having money. Owing $5 is the opposite of having $5.

1. What is the opposite of owing $10? _____
2. What is the opposite of having $17? _____

David borrowed $4 from his mother each of the last three months. How much money does he owe his mother? The money he owes his mother is a negative number. This problem can be pictured on a number line.



Use the number line to help you answer the questions.

3. Starting at zero, which direction do you move first? _____
4. How many places do you move? _____
5. Which direction do you move next? _____
6. How many places do you move? _____
7. Which direction do you move next? _____
8. How many places do you move? _____
9. How much money does David owe his mother? _____
10. If David borrowed $4 for one more month, how much would he owe his mother? _____

Name _____ Date _____ Class _____

LESSON 2-4

Review for Mastery

Multiplying and Dividing Integers

Look for the patterns in these products and quotients.

$1 \cdot 3 = 3$	$-1 \cdot 3 = -3$	$3 \div 1 = 3$	$3 \div (-1) = -3$
$2 \cdot 3 = 6$	$-2 \cdot 3 = -6$	$6 \div 2 = 3$	$6 \div (-2) = -3$
$-3 \cdot (-3) = 9$	$3 \cdot (-3) = -9$	$-9 \div (-3) = 3$	$-9 \div 3 = -3$
$-4 \cdot (-3) = 12$	$4 \cdot (-3) = -12$	$-12 \div (-4) = 3$	$-12 \div 4 = -3$

Look at how to find the signs of the products.

- The product of two integers with the **same sign** is **positive.**

$(+) \cdot (+) = (+)$ $(-) \cdot (-) = (+)$

- The product of two integers with **different signs** is **negative.**

$(+) \cdot (-) = (-)$ $(-) \cdot (+) = (-)$

Look at how to find the signs of the quotients.

- The quotient of two integers with the **same sign** is **positive.**

$(+) \div (+) = (+)$ $(-) \div (-) = (+)$

- The quotient of two integers with **different signs** is **negative.**

$(+) \div (-) = (-)$ $(-) \div (+) = (-)$

Find each product or quotient.

1. $-5 \cdot 4$ _____
2. $2 \cdot (-8)$ _____
3. $-1 \cdot (-1)$ _____
4. $-6 \cdot 3$ _____
5. $7 \cdot (-3)$ _____
6. $-8 \cdot (-4)$ _____
7. $-6 \cdot 5$ _____
8. $-9 \cdot (-9)$ _____
9. $36 \div (-4)$ _____
10. $-27 \div 9$ _____
11. $-24 \div (-6)$ _____
12. $-30 \div 5$ _____
13. $18 \div 6$ _____
14. $32 \div (-8)$ _____
15. $-45 \div 9$ _____
16. $-40 \div (-10)$ _____

Name _____ Date _____ Class _____

LESSON 2-4

Student Worksheet

Multiplying and Dividing Integers

Problem 1

The rules for multiplying and dividing integers are the same.

Same signs ⟶ Positive

$(+) \bullet (+) = +$ $\quad (-) \bullet (-) = +$
$(+) \div (+) = +$ $\quad (-) \div (-) = +$

Different signs ⟶ Negative

$(-) \bullet (+) = -$ $\quad (+) \bullet (-) = -$
$(+) \div (-) = -$ $\quad (-) \div (+) = -$

Determine if each product or quotient is positive, +, or negative, −.

$(-3) \bullet (-3)$ ⟶ positive, +

$6 \div (-3)$ ⟶ negative, −

Problem 2

When dividing integers, follow these steps:
1. Divide the integers.
2. Look at the signs of each number to give the answer a sign.

$-100 \div (-5)$

Think: $- \div - = +$

$-100 \div (-5) = +20$

Think and Discuss

1. Why is the quotient of $-100 \div (-5)$ the same as the quotient of $100 \div 5$?

_____

_____

2. Is $6 \div (-3)$ the same as $-6 \div 3$? Explain.

_____

Name _____ Date _____ Class _____

LESSON 2-11

Practice A

Equivalent Fractions and Decimals

Write each fraction as a decimal. Round to the nearest hundredth, if necessary.

1. $\frac{2}{3}$ _____
2. $\frac{9}{20}$ _____
3. $\frac{3}{4}$ _____
4. $\frac{20}{25}$ _____
5. $\frac{3}{8}$ _____
6. $\frac{7}{5}$ _____
7. $\frac{21}{7}$ _____
8. $\frac{5}{3}$ _____
9. $\frac{4}{9}$ _____
10. $\frac{4}{5}$ _____
11. $\frac{1}{25}$ _____
12. $\frac{3}{20}$ _____

Write each decimal as a fraction or mixed number in simplest form.

13. 0.55 _____
14. 0.03 _____
15. –0.75 _____
16. 2.1 _____
17. 5.25 _____
18. 9.33 _____
19. 1.8 _____
20. –1.74 _____
21. 10.6 _____
22. –7.08 _____
23. 0.625 _____
24. 0.001 _____

Write each answer as a decimal rounded to the nearest thousandth.

25. Out of 45 times at bat, Raul got 19 hits. Find Raul's batting average.

_____

26. On a test, Selena answered 26 out of 30 questions correctly. What portion of her answers was correct?

_____

Name _____ Date _____ Class_____

LESSON 2-11

Reading Strategies

Compare and Contrast

Compare what happens when fractions are changed to decimals.

$\frac{2}{5}$ • Read $\frac{2}{5}$ as "2 divided by 5." • Write ⟶ $2 \div 5$

Change a fraction to a decimal by dividing the numerator by the denominator.

$$5\overline{)2.0}\quad 0.4$$
$$-20$$
$$0$$

$\frac{2}{5} = 0.4$ The dividing ends, or terminates, with no remainder. 0.4 is called a terminating decimal.

1. Is there a remainder in the problem? How do you know?

_____

_____

2. What do we call a decimal that ends with no remainder?

_____

$\frac{2}{6}$ • Read $\frac{2}{6}$ as "2 divided by 6." • Write ⟶ $2 \div 6$

$$6\overline{)2.000}\quad 0.333$$
$$-18$$
$$20$$
$$-18$$
$$20$$
$$-18$$
$$2$$

$\frac{2}{6} = 0.333\ldots$ or $0.\overline{3}$ ⟵ Note how dividing continues in a pattern. The number 0.333 . . . is a repeating decimal. The bar over the 3 means 3 repeats.

Answer each question.

3. Compare the division of $\frac{2}{5}$ to the division of $\frac{2}{6}$. What is the difference?

_____

_____

4. What is the name for a decimal with a remainder that has a repeating pattern?

_____

Name _____ Date _____ Class _____

LESSON 2-11

Review for Mastery

Equivalent Fractions and Decimals

To write a fraction as a decimal, divide the numerator of the fraction by the denominator of the fraction.

Write $\frac{3}{7}$ as a decimal.

- Divide 3 by 7.
- To round your answer to the nearest hundredth, add 3 zeros after the decimal point in the divisor.

$$7\overline{)3.000}\quad 0.428$$

$$-28\downarrow$$
$$20$$
$$-14\downarrow$$
$$60$$
$$-56$$
$$4$$

0.428 rounded to the nearest hundredth is 0.43.

1. Write $\frac{2}{5}$ as a decimal. $\frac{2}{5} =$ _____

$$5\overline{)2.0}$$
$$-\_\_\_$$
$$\_\_\_$$

Write each fraction as a decimal. Round to the nearest thousandth, if necessary.

2. $\frac{3}{4}$ _____ 3. $\frac{7}{8}$ _____ 4. $\frac{3}{2}$ _____ 5. $\frac{5}{3}$ _____

To write a decimal as a fraction:
Step 1: Use place value to read the decimal. Say the number aloud.
Step 2: Write a fraction for the number you just said.
Step 3: Simplify if necessary.

Write 0.005 as a fraction.
Read 0.005 as "five thousandths."
Write $\frac{5}{1000}$ for five thousandths.
Simplify: $\frac{5 \div 5}{1{,}000 \div 5} = \frac{1}{200}$

Write 1.6 as a fraction.
Read 1.6 as "one and six tenths."
Write $1\frac{6}{10}$ for one and six tenths.
Simplify: $1\frac{6 \div 2}{10 \div 2} = 1\frac{3}{5}$

Write each decimal as a fraction or mixed number in simplest form.

6. 0.8 _____ 7. 2.25 _____ 8. –0.02 _____

Name _____ Date _____ Class _____

LESSON 2-11

Student Worksheet

Equivalent Fractions and Decimals

Problem 1

So far, I have 20 hits out of 32 at bats. What is my average?

$$\text{Average} = \frac{\text{hits}}{\text{at bats}} = \frac{20}{32}$$

$\frac{20}{32}$ = What decimal?

$\frac{20}{32}$ $\qquad$ $32\overline{)20}$

$$\frac{20}{32} = 32\overline{)20} = 32\overline{)20.000}$$

$$\begin{array}{r} 0.625 \\ -19\,2 \\ \hline 80 \\ -64 \\ \hline 160 \\ -160 \\ \hline 0 \end{array}$$

His batting average is 0.625.

Problem 2

What is 0.036?

6 is in the "thousandths" position on the place value chart.

$$0.036 \longrightarrow \frac{36}{1{,}000}$$

$$\frac{36}{1{,}000} \quad \begin{matrix} \div 4 \\ \div 4 \end{matrix} \quad = \frac{9}{250}$$

Think and Discuss

1. Is the baseball average in Problem 1 a terminating or repeating decimal? Explain.

_____

2. What is the place value of the 6 in 0.625? _____

3. Complete: 0.036 = thirty-six- _____

4. Are these two decimals different? Explain.

0.3333333333333… **0.3**

_____

2-11 Exercises

Homework Help — THINK central
Go to thinkcentral.com
Exercises 1–34, 43, 45, 47, 49, 51

MA.7.A.5.1

GUIDED PRACTICE

See Example 1 — Write each fraction as a decimal. Round to the nearest hundredth, if necessary.

1. $\frac{4}{7}$ 2. $\frac{21}{8}$ 3. $\frac{11}{6}$ 4. $\frac{7}{9}$

See Example 2 — Write each fraction as a decimal.

5. $\frac{3}{25}$ 6. $\frac{5}{18}$ 7. $\frac{9}{11}$ 8. $\frac{3}{5}$

See Example 3 — Write each decimal as a fraction in simplest form.

9. 0.008 10. 0.6 11. 2.05 12. 3.75

See Example 4

13. **Sports** After sweeping the Baltimore Orioles at home in 2001, the Seattle Mariners had a record of 103 wins out of 143 games played. Find the Mariners' winning rate. Write your answer as a decimal rounded to the nearest thousandth.

INDEPENDENT PRACTICE

See Example 1 — Write each fraction as a decimal. Round to the nearest hundredth, if necessary.

14. $\frac{9}{10}$ 15. $\frac{32}{5}$ 16. $\frac{18}{25}$ 17. $\frac{7}{8}$

18. $\frac{16}{11}$ 19. $\frac{500}{500}$ 20. $\frac{17}{3}$ 21. $\frac{23}{12}$

See Example 2 — Write each fraction as a decimal.

22. $\frac{5}{4}$ 23. $\frac{7}{9}$ 24. $\frac{13}{3}$ 25. $\frac{11}{20}$

See Example 3 — Write each decimal as a fraction in simplest form.

26. 0.45 27. 0.01 28. 0.25 29. 0.08

30. 1.8 31. 15.25 32. 5.09 33. 8.375

See Example 4

34. **School** On a test, Caleb answered 73 out of 86 questions correctly. What portion of his answers was correct? Write your answer as a decimal rounded to the nearest thousandth.

PRACTICE AND PROBLEM SOLVING

Give two numbers equivalent to each fraction or decimal.

35. $8\frac{3}{4}$ 36. 0.66 37. 5.05 38. $\frac{8}{25}$

39. 15.35 40. $8\frac{3}{8}$ 41. $4\frac{3}{1{,}000}$ 42. $3\frac{1}{3}$

Determine whether the numbers in each pair are equivalent.

43. $\frac{3}{4}$ and 0.75 44. $\frac{7}{20}$ and 0.45 45. $\frac{2}{3}$ and 0.67 46. 0.8 and $\frac{4}{5}$

47. 0.275 and $\frac{11}{40}$ 48. $1\frac{5}{6}$ and 1.83 49. 0.41 and $\frac{11}{27}$ 50. 0.35 and $\frac{7}{20}$

○ = WORKED-OUT SOLUTIONS on p. WS4

Economics LINK

Use the table for Exercises 51 and 52.

XYZ Stock Values (October 2006)				
Date	Open	High	Low	Close
Oct 16	17.89	18.05	17.5	17.8
Oct 17	18.01	18.04	17.15	17.95
Oct 18	17.84	18.55	17.81	18.20

Traders watch the stock prices change from the floor of a stock exchange.

Before the days of computer technology, ticker-tape machines were used to punch the stock prices onto paper strands.

51. Write the highest value of stock XYZ for each day as a mixed number in simplest form.

52. On which date did the price of stock XYZ change by $\frac{9}{25}$ of a dollar between the open and close of the day?

53. **Write About It** Until recently, prices of stocks were expressed as mixed numbers, such as $24\frac{15}{32}$ dollars. The denominators of such fractions were multiples of 2, such as 2, 4, 6, 8, and so forth. Today, the prices are expressed as decimals to the nearest hundredth, such as 32.35 dollars.

- **a.** What are some advantages of using decimals instead of fractions?
- **b.** The old ticker-tape machine punched stock prices onto a tape. Perhaps because fractions could not be shown using the machine, the prices were punched as decimals. Write some decimal equivalents of fractions that the machine might print.

54. **Challenge** Write $\frac{1}{9}$ and $\frac{2}{9}$ as decimals. Use the results to predict the decimal equivalent of $\frac{8}{9}$.

Florida Spiral Review

MA.7.A.5.1, MA.7.A.3.3

55. **Multiple Choice** Which is equivalent to $\frac{5}{6}$?

A. 0.83 **B.** 0.833 **C.** $0.8\overline{3}$ **D.** $0.\overline{83}$

56. **Gridded Response** What is $\frac{7}{16}$ written as a decimal?

Find each quotient. (Lesson 2-4)

57. $51 \div (-3)$ **58.** $-121 \div 11$ **59.** $-91 \div (-7)$ **60.** $-57 \div 0$

Solve the equation. (Lesson 2-6)

61. $3x - 5 = 1$ **62.** $5x + 4 = 19$ **63.** $36 + 9x = 162$ **64.** $-9 = -9x - 9$

Name _____ Date _____ Class _____

LESSON 3-4

Practice A

Multiplying Decimals

Multiply. Choose the letter for the best answer.

1. 5 • 0.05

   A 25 C 0.25

   B 2.5 D 0.025

2. 9 • 0.7

   F 63 H 0.63

   G 6.3 I 0.063

3. 6 • 0.003

   A 18 C 0.18

   B 1.8 D 0.018

4. 5 • 1.2

   F 60 H 0.6

   G 6 I 0.06

Simplify. Choose the letter for the best answer.

5. 6 • 1.8

   A 10.8 C 0.108

   B 1.08 D 0.0108

6. $(0.4)^2$

   F 16 H 0.16

   G 1.6 I 0.016

7. 3 • 8.4

   A 25.2 C 0.252

   B 2.52 D 0.0252

8. 7 • 0.51

   F 357 H 3.57

   G 35.7 I 0.357

Multiply. Estimate to check whether each answer is reasonable.

9. 6.8 • 4 _____

10. 8.1 • (–2) _____

11. 9.5 • 5 _____

12. 3.5 • 7 _____

13. –6.3 • 6 _____

14. 9 • 3.7 _____

15. –6.7 • (–5) _____

16. 8.8 • (–8) _____

17. 5.2 • (–4) _____

18. –3 • 4.1 _____

19. 1.5 • 1.2 _____

20 –2.3 • 1.7 _____

21. Cecile walked 3.7 miles each day for 8 days last month. How many miles total did Cecile walk last month?

_____

Name _____ Date _____ Class _____

LESSON 3-4

Reading Strategies

Compare and Contrast

Decimals are multiplied in much the same way that you multiply whole numbers.

Multiply Whole Numbers	Multiply Decimals
5	0.5
$\times$ 7	$\times$ 0.7
35	0.35

Compare multiplying whole numbers to multiplying decimals.

1. What is the same about multiplying whole numbers and decimals?

_____

2. What is different about multiplying whole numbers and decimals?

_____

_____

It is important to place the decimal point correctly in the product.

Steps for Placing the Decimal Point in the Product	**Example:** 1.**37** $\times$ 0.**8**
Step 1: Find the product.	1096
Step 2: Count the number of decimal places in each factor.	1.**37** $\longrightarrow$ 2 places 0.**8** $\longrightarrow$ 1 place
Step 3: Find the total number of decimal places in both numbers.	3 places
Step 4: Using the number found in Step 3, move that number of places to the left in the product and place the decimal point.	1.096

3. How many decimal places are in 0.63?

_____

4. How many decimal places are in 4.231?

_____

5. How many decimal places will be in the product of 0.63 $\times$ 4.231?

_____

Name _____ Date _____ Class_____

LESSON 3-4

Review for Mastery

Multiplying Decimals

To multiply two decimals:
Step 1: Round each number to the nearest integer.
Step 2: Multiply the integers to estimate the product.
Step 3: Multiply the decimals.
Step 4: Place the decimal point in the product to make it closest to the estimate.

Multiply: 2.7 • 4.3

$$\begin{array}{r} 4.3 \\ \underline{2.7} \\ 301 \\ \underline{860} \\ 11.61 \end{array}$$

11.61 is close to 12.

Think:
2.7 rounds to 3.
4.3 rounds to 4.
3 • 4 = 12
Place the decimal point in the product to make it closest to 12.

Multiply or simplify.

1. 6.7 • 9.1

   6.7 rounds to _____

   9.1 rounds to _____

   The product is close to _____.

   Product: _____

2. –3.21 • 8.8

   –3.21 rounds to _____

   8.8 rounds to _____

   The product is close to _____.

   Product: _____

3. $(4.1)^2$

   4.1 rounds to _____

   The product is close to _____.

   Product: _____

4. 12.3 • (–2.7)

   12.3 rounds to _____

   –2.7 rounds to _____

   The product is close to _____.

   Product: _____

Simplify. Estimate to place the decimal point.

5. 2.06 • 7.9

   _____

6. –4.89 • 0.6

   _____

7. 8.23 • (–4.2)

   _____

8. $(5.3)^2$

   _____

Name _____ Date _____ Class _____

LESSON 3-4

Student Worksheet

Multiplying Decimals

Problem 1

Multiply.

1.25 • 23

$\underbrace{1.25}_{1\ 2}$ ⇒ 2 decimal places

23 ⇒ 0 decimal places

2 + 0 = 2 decimal places in the answer ⇨

$$\begin{array}{r} 1.25 \\ \times\ 23 \\ \hline 375 \\ +\ 2500 \\ \hline 28.75 \end{array}$$

Problem 2

Multiply.

1.2 • 1.6

$\underbrace{1.2}_{1}$ ⇒ 1 decimal place

$\underbrace{1.6}_{1}$ ⇒ 1 decimal place

1 + 1 = 2 decimal places in the answer ⇨

$$\begin{array}{r} 1.2 \\ \times\ 1.6 \\ \hline 72 \\ +\ 120 \\ \hline 1.92 \end{array}$$

Think and Discuss

1. Explain how to determine the number of decimal places in the product of a multiplication problem involving decimal factors.

2. To place the decimal point in the product of two decimals, do you move the decimal point to the left or do you move the decimal point to the right?

3. Explain how to determine if your answer to Problem 1 is reasonable.

Name _____ Date _____ Class _____

LESSON 3-5

Practice A

Dividing Decimals

Divide. Estimate to check whether your answer is reasonable.

1. $7.5\overline{)15}$

2. $1.2\overline{)72}$

3. $1.5\overline{)45}$

4. $7.5\overline{)-22.5}$

5. $4.8\overline{)16.8}$

6. $-2.7\overline{)11.07}$

Divide. Estimate to check whether your answer is reasonable.

7. $2.8\overline{)14}$

8. $-5.6\overline{)21}$

9. $3.2\overline{)48}$

10. $2.25\overline{)9}$

11. $2.4\overline{)6}$

12. $-1.25\overline{)65}$

13. Jessie used 2.7 gallons of gas to drive her car 72.9 miles. What was her car's gas mileage? _____

14. Ernesto bicycled 267 miles last week at an average speed of 8.9 mi/h. How many hours did he bicycle? _____

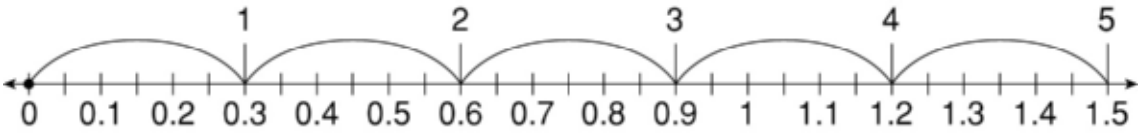
Name _____ Date _____ Class _____

LESSON 3-5

Reading Strategies

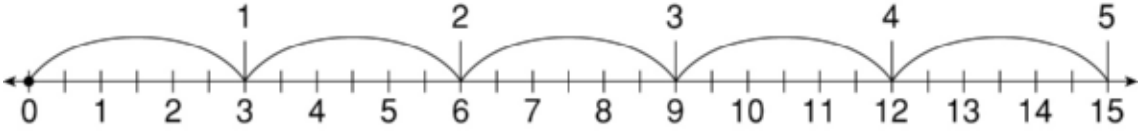
Use a Visual Model

John has a piece of lumber 1.5 meters long. He needs to cut it into pieces that are 0.3 meter long. How many pieces can he cut? The number line shows a model of the problem.



$1.5 \div 0.3 = 5$

Sarah has 15 feet of yarn. She needs to cut it into lengths of 3 feet each. How many pieces can she cut? The number line shows a model of the problem.



$15 \div 3 = 5$

Answer each question.

1. Compare the equations for the number lines above. What is the same about the equations?

   _____

2. What is different?

   _____

   _____

3. Compare the quotients of both problems. What do you notice?

   _____

4. How can you change 1.5 to 15?

   _____

5. How can you change 0.3 to 3?

   _____

6. If you moved the decimal point in **both** the divisor and the dividend, would the quotient change?

   _____

Name _____ Date _____ Class_____

LESSON 3-5

Review for Mastery

Dividing Decimals

To divide a decimal by a decimal:

Step 1: Make the divisor a whole number by moving the decimal point to the right.

Step 2: Move the decimal point in the dividend the same number of places. Remember to place the decimal in the quotient directly above the decimal point in the dividend.

Step 3: Divide.

Divide: $1.68 \div 0.3 \rightarrow 0.3\overline{)1.68} \rightarrow 3\overline{)16.8}$

$$\begin{array}{r} 5.6 \\ 3\overline{)16.8} \\ -15\downarrow \\ \quad 18 \\ \quad -18 \end{array}$$

The divisor, 0.3, has 1 decimal place. Move the decimal point 1 place to the right in both the divisor and the dividend.

Complete.

1. $5.6\overline{)4.48}$

a. How many decimal places are in the divisor? _____

b. How many places do you need to move each decimal point? _____

c. Rewrite the division. _____

d. Complete the division. What is the quotient? _____

Divide.

2. $5.2\overline{)3.64}$

3. $0.09\overline{)36.45}$

4. $0.59\overline{)0.708}$

Name _____ Date _____ Class _____

LESSON 3-5

Review for Mastery

Dividing Decimals (continued)

Sometimes it is necessary to write zeros in the dividend.

$6 \div 0.25 \rightarrow 0.25\overline{)6} \rightarrow 0.25\overline{)6.00} \rightarrow 25\overline{)600}$

$$\begin{array}{r} 24 \\ 25\overline{)600} \\ -50\downarrow \\ \hline 100 \\ -100 \\ \hline \end{array}$$

The divisor, 0.25, has 2 decimal places. In order to move the decimal point 2 places to the right in the divisor and the dividend, you need to write 2 zeros in the dividend.

Complete.

5. $0.35\overline{)7}$

a. How many decimal places are in the divisor? _____

b. How many places do you need to move each decimal point? _____

c. How many zeros do you need to write in the dividend? _____

d. Complete the division. What is the quotient? _____

Divide.

6. $1.6\overline{)8}$

7. $0.12\overline{)19.2}$

8. $1.25\overline{)48}$

Name _____ Date _____ Class _____

LESSON 3-5

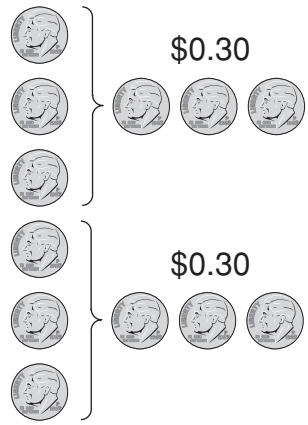
Student Worksheet

Dividing Decimals

Problem 1

How many groups of $0.30 are there?

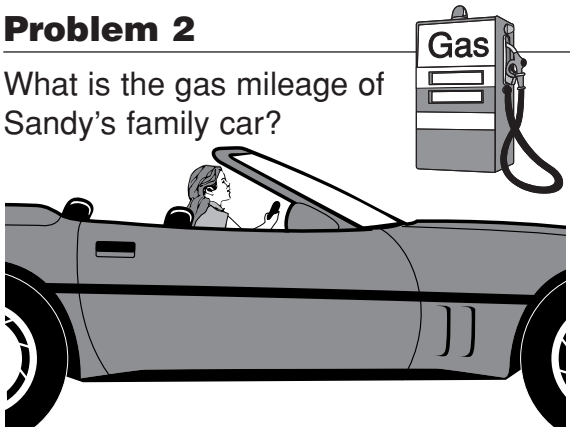
$0.60



There are 2 groups. $0.60 ÷ $0.30 = 2

Problem 2

What is the gas mileage of Sandy's family car?



Sandy drove 358.8 miles.
The car used 14.95 gallons of gas.

Gas Mileage:

$$\frac{\text{miles driven} \rightarrow 358.8 \text{ miles}}{\text{gallons used} \rightarrow 14.95 \text{ gallons}}$$

$14.95\overline{)358.80}$ Divide

Gas mileage: 24 miles per gallon

Think and Discuss

1. What do you multiply the divisor and the dividend by in Problem 2 to eliminate the decimal point in the divisor? _____

2. When dividing a decimal by a decimal, why can you move the decimal points?

_____

_____

3-5 Exercises

Homework Help — THINK central
Go to thinkcentral.com
Exercises 1–27, 31, 33, 35, 37, 39, 41

MA.7.A.3.2

GUIDED PRACTICE

See Example 1 — **Divide.**

1. $3.78 \div 4.2$
2. $13.3 \div (-0.38)$
3. $14.49 \div 3.15$
4. $1.06 \div 0.2$
5. $-9.76 \div 3.05$
6. $263.16 \div (-21.5)$

See Example 2 — **Divide. Estimate to check whether each answer is reasonable.**

7. $3 \div 1.2$
8. $84 \div 2.4$
9. $36 \div (-2.25)$
10. $24 \div (-1.2)$
11. $-18 \div 3.75$
12. $189 \div 8.4$

See Example 3

13. **Transportation** Samuel used 14.35 gallons of gas to drive his car 401.8 miles. How many miles per gallon did he get?

INDEPENDENT PRACTICE

See Example 1 — **Divide.**

14. $81.27 \div 0.03$
15. $-0.408 \div 3.4$
16. $38.5 \div (-5.5)$
17. $-1.12 \div 0.08$
18. $27.82 \div 2.6$
19. $14.7 \div 3.5$

See Example 2 — **Divide. Estimate to check whether each answer is reasonable.**

20. $35 \div (-2.5)$
21. $361 \div 7.6$
22. $63 \div (-4.2)$
23. $5 \div 1.25$
24. $14 \div 2.5$
25. $-78 \div 1.6$

See Example 3

26. **Transportation** Lonnie used 26.75 gallons of gas to drive his truck 508.25 miles. How many miles per gallon did he get?
27. Mitchell walked 8.5 laps in 20.4 minutes. If he walked each lap at the same pace, how long did it take him to walk one full lap?

PRACTICE AND PROBLEM SOLVING

Divide. Estimate to check whether each answer is reasonable.

28. $-24 \div 0.32$
29. $153 \div 6.8$
30. $-2.58 \div (-4.3)$
31. $4.12 \div (-10.3)$
32. $-17.85 \div 17$
33. $64 \div 2.56$

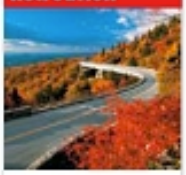
Simplify each expression. Justify your steps using the Commutative, Associative, and Distributive Properties when neccessary.

34. $2^2 \cdot (6.8 \div 3.4) \cdot 5$
35. $11.7 \div (0.7 + 0.6) \cdot 2$
36. $4 \cdot 5(0.6 + 0.2) \cdot 0.25$
37. $(1.6 \div 3.2) \cdot (4.2 + 8.6)$
38. **Critical Thinking** A car loan totaling \$13,456.44 is to be paid off in 36 equal monthly payments. Lin Yao can afford no more than \$350 per month. Can she afford the loan? Explain.

○ = WORKED-OUT SOLUTIONS on p. WS4

LINK

Recreation



The Blue Ridge Parkway is the longest, narrowest national park in the world. Starting in Virginia, it covers 469 miles and ends at the entrance of the Great Smoky Mountains NP in North Carolina.

39. **Earth Science** Glaciers form when snow accumulates faster than it melts and thus becomes compacted into ice under the weight of more snow. Once the ice reaches a thickness of about 18 m, it begins to flow. If ice were to accumulate at a rate of 0.0072 m per year, how long would it take to start flowing?

40. **Critical Thinking** Explain why using estimation to check the answer to $56.21457 \div 7$ is useful.

41. **Recreation** The graph shows the approximate number of total visits to the three most visited U.S. national parks in 2006. What was the average number of visits to these three parks? Round your answer to the nearest hundredth.

Source: National Park Service

42. **Write a Problem** Find some supermarket advertisements. Use the ads to write a problem that can be solved by dividing a decimal by a whole number.

43. **Write About It** Can you use the Commutative Property when dividing decimals? Explain.

44. **Challenge** Use a calculator to simplify the expression $(2^3 \cdot 7.5 + 3.69) \div 48.25 \div [1.04 - (0.08 \cdot 2)]$.

Florida Spiral Review

MA.7.A.3.2, MA.7.A.3.3

45. **Multiple Choice** Which expression is NOT equal to -1.34?

A. $-6.7 \div 5$ B. $16.08 \div (-12)$ C. $-12.06 \div (-9)$ D. $-22.78 \div 17$

46. **Multiple Choice** A deli is selling 5 sandwiches for $5.55, including tax. A school spent $83.25 on roast beef sandwiches for its 25 football players. How many sandwiches did each player get?

F. 1 G. 2 H. 3 I. 5

47. **Gridded Response** Rujuta spent a total of $49.65 on 5 CDs. What was the average cost in dollars for each CD?

Solve each equation. Check your answer. (Lesson 1-8)

48. $n - 22 = 16$ 49. $y + 27 = 42$ 50. $x - 81 = 14$

51. $t - 32 = 64$ 52. $z + 39 = 72$ 53. $a + 43 = 61$

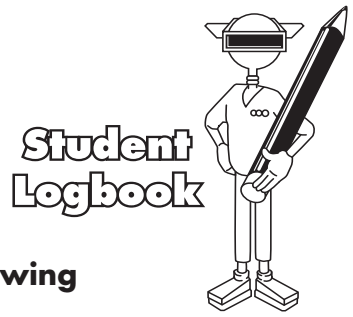
Multiply. Estimate to check whether each answer is reasonable. (Lesson 3-4)

54. $-2.75 \cdot 6.34$ 55. $0.2 \cdot (-4.6) \cdot (-2.3)$ 56. $1.3 \cdot (-6.7)$

57. $-6.87 \cdot (-2.65)$ 58. $9 \cdot 4.26$ 59. $7.13 \cdot (-14)$

Name _____ Date _____

COURSE: **MSC IV**
MODULE 2: **Decimals**
UNIT 4: **Dividing Decimals**



Estimating and Finding Quotients

As you work through the tutorial, complete the following statements and questions.

1. What do kilowatts and horsepower measure? _____

2. How much power in kilowatts is needed for the fountain lights and pump? _____

3. According to the *Earth Guide*, 1 horsepower is equal to _____ kilowatt.

4. What expression describes the power in horsepower that is needed for the fountain lights and pump? _____

5. Why does Dijit multiply $\frac{1.865}{0.746}$ by $\frac{1{,}000}{1{,}000}$? _____
_____

6. Does multiplying by $\frac{1{,}000}{1{,}000}$ change the value of the fraction? _____ Explain your answer. _____
_____

7. In order to estimate the horsepower needed for the fountain lights and pump, Dijit and Jack rounded each decimal number to the nearest _____ . The estimated power needed is _____ kW.

8. Why does Dijit add a decimal point and a zero to the dividend?
_____

9. To divide decimals, first multiply the divisor by a power of _____ to make it a _____ number. Then, multiply the dividend by the same _____ of _____ before you divide.

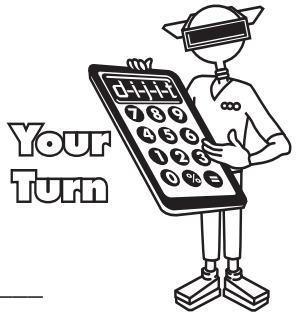
Key Words:
Decimal
Division

Learning Objectives:

- Expressing a decimal denominator as a whole number by multiplying the numerator and denominator of the fraction by a power of 10
- Dividing a decimal number by a decimal number
- Adding zeros to the right of a decimal point to act as place holders in a dividend
- Estimating an answer when dividing by decimals

Name _____ Date _____

COURSE: **MSC IV**
MODULE 2: **Decimals**
UNIT 4: **Dividing Decimals**



Estimating and Finding Quotients

1. a. In the problem $3.7\overline{)108.41}$, what is the first step? _____

_____

b. Find the quotient of $6.3\overline{)236.88}$ _____

c. 1,584 ÷ 13.2 = _____

d. 87.63 ÷ 6.35 = _____

2. A tire manufacturer uses the formula $C = \pi d$ to calculate the meter circumference of a tire, where d represents the diameter of the tire and $\pi = 3.14$.

a. Estimate the diameter of the tire to the nearest whole number. ____

b. Calculate the diameter of the tire to the nearest hundredth. ____

c. Check your answer to part (b) by multiplying the divisor and the quotient. Show your work.

3. The watt is a unit of power, and 1 kilowatt (kW) = 1,000 watts.

a. After 9.5 hours, a meter reads 13.56 kilowatt-hours (kWh). How many kilowatt-hours were used during one hour? Round your answer to the nearest hundredth. _____

b. If an electric bill shows a total of 2,977.2 kWh used at a rate of 4.135 kWh per hour, how long was the billing cycle? _____

Name _____ Date _____ Class_____

LESSON 3-10

Practice A

Multiplying Fractions and Mixed Numbers

Simplify. Choose the letter for the best answer.

1. $\left(\frac{3}{8}\right)^2$

   A $\frac{9}{64}$ C $\frac{9}{16}$

   B $\frac{6}{16}$ D $\frac{6}{8}$

2. $\frac{2}{5} \cdot \frac{3}{4}$

   F $\frac{1}{4}$ H $\frac{3}{10}$

   G $\frac{2}{3}$ I $\frac{5}{9}$

3. $4 \cdot 3\frac{3}{5}$

   A $2\frac{2}{5}$ C $13\frac{1}{5}$

   B 12 D $14\frac{2}{5}$

4. $1\frac{1}{4} \cdot 2\frac{2}{3}$

   F $2\frac{1}{6}$ H $3\frac{2}{3}$

   G $3\frac{1}{3}$ I $3\frac{11}{12}$

Simplify. Write each answer in simplest form.

5. $\left(\frac{1}{3}\right)^2$ _____

6. $8 \cdot \frac{1}{4}$ _____

7. $10 \cdot \frac{1}{5}$ _____

8. $\frac{1}{2} \cdot \frac{1}{4}$ _____

9. $\frac{1}{4} \cdot \left(-\frac{2}{3}\right)$ _____

10. $\left(\frac{2}{3}\right)^3$ _____

11. $-16 \cdot \frac{3}{4}$ _____

12. $24 \cdot \frac{5}{6}$ _____

13. $32 \cdot \frac{3}{8}$ _____

14. $2\frac{1}{4} \cdot \frac{1}{2}$ _____

15. $3\frac{1}{3} \cdot \frac{3}{5}$ _____

16. $5\frac{1}{3} \cdot \frac{1}{4}$ _____

17. $1\frac{1}{2} \cdot 1\frac{1}{5}$ _____

18. $1\frac{2}{5} \cdot 2\frac{3}{4}$ _____

19. $2\frac{2}{7} \cdot 3\frac{1}{8}$ _____

20. Louis spent 12 hours last week practicing guitar. If $\frac{1}{4}$ of the time was spent practicing chords, how much time did he spend practicing chords? _____

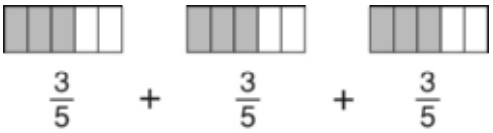
Name _____ Date _____ Class _____

LESSON 3-10

Reading Strategies

Use Fraction Strips

You can write a multiplication problem as a repeated addition problem.



$\frac{3}{5} + \frac{3}{5} + \frac{3}{5}$

$\frac{3}{5} + \frac{3}{5} + \frac{3}{5}$ ← Repeated addition

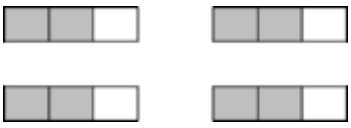
Use the fraction strips above to answer questions 1–4.

1. What fractional part of the fraction strips is shaded? _____
2. How many fraction strips are there? _____
3. Count the number of fractional parts that are shaded in all. How many are there? _____
4. How can you find the answer to the problem above using addition?

_____

You can also find the answer to the above problem using multiplication. $3 \times \frac{3}{5} = \frac{9}{5}$

Use the fraction strips below to answer questions 5–7.



5. What fractional part of each fraction strip is shaded? _____
6. How many of these fraction strips are there? _____
7. Write a multiplication equation for this picture. _____

Name _____ Date _____ Class_____

LESSON 3-10

Review for Mastery

Multiplying Fractions and Mixed Numbers

To multiply fractions and mixed numbers:
Step 1: Write any mixed numbers as improper fractions.
Step 2: Multiply the numerators.
Step 3: Multiply the denominators.
Step 4: Write the answer in simplest form.

Multiply: $\frac{4}{9} \cdot \frac{3}{8}$

$$\frac{4}{9} \cdot \frac{3}{8} = \frac{4 \cdot 3}{9 \cdot 8} = \frac{12}{72} = \frac{1}{6}$$

Divide numerator and denominator by 12, the GCF.

Multiply: $6\frac{1}{4} \cdot \left(-1\frac{4}{5}\right)$

$$6\frac{1}{4} \cdot \left(-1\frac{4}{5}\right) = \frac{25}{4} \cdot \left(\frac{-9}{5}\right) = \frac{25 \cdot (-9)}{4 \cdot 5} = \frac{-225}{20} = -11\frac{1}{4}$$

Remember, positive times negative equals negative.

Multiply. Write each answer in simplest form.

1. $6 \cdot \frac{1}{9} = \frac{6 \cdot 1}{9} = \frac{\quad}{\quad} = \quad$

2. $-\frac{4}{5} \cdot \frac{5}{7} = -\frac{4 \cdot}{5 \cdot} = -\frac{\quad}{\quad} = -\quad$

3. $3\frac{1}{3} \cdot 9 = \frac{10}{3} \cdot 9 = \frac{10 \cdot}{\quad} = \frac{\quad}{\quad} = \quad$

4. $\frac{3}{10} \cdot 2\frac{1}{2} = \frac{3}{10} \cdot \frac{5}{2} = \frac{\cdot}{\cdot} = \frac{\quad}{\quad} = \quad$

5. $\left(\frac{1}{2}\right)^2$ _____

6. $-\frac{5}{9} \cdot \frac{3}{4}$ _____

7. $\frac{9}{10} \cdot \left(-\frac{2}{3}\right)$ _____

8. $2\frac{5}{8} \cdot \frac{2}{3}$ _____

9. $\frac{1}{2} \cdot 4\frac{1}{4}$ _____

10. $-\frac{2}{3} \cdot 1\frac{3}{4}$ _____

11. $5\frac{1}{5} \cdot \left(-1\frac{2}{3}\right)$ _____

12. $4\frac{1}{2} \cdot 1\frac{1}{9}$ _____

13. $-2\frac{3}{4} \cdot \left(-1\frac{1}{3}\right)$ _____

Name _____ Date _____ Class _____

LESSON 3-10

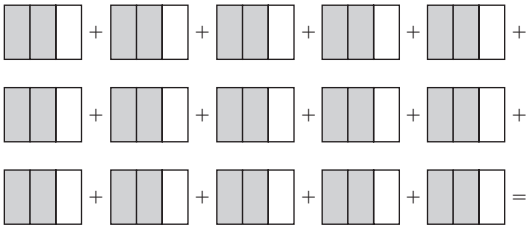
Student Worksheet

Multiplying Fractions and Mixed Numbers

Problem 1

Multiply. $-15 \cdot \frac{2}{3}$

$-15 \cdot \frac{2}{3}$ is the same as 15 groups of $\frac{2}{3}$.



$\frac{30}{3} = 10$

Since the signs are different, the product is -10.

Problem 2

Multiply. $\frac{1}{3} \cdot 4\frac{1}{2}$

Write $4\frac{1}{2}$ as an improper fraction.

$$4\frac{1}{2} = \frac{4 \cdot 2 + 1}{2} = \frac{8 + 1}{2} = \frac{9}{2}$$

$$\frac{1}{3} \cdot \frac{9}{2} = \frac{9}{6} = \frac{3}{2}$$

Write $\frac{3}{2}$ as a mixed number.

$$2\overline{)3} = 1\frac{1}{2}$$
$$\underline{-2}$$
$$1$$

$$\frac{1}{3} \cdot 4\frac{1}{2} = \frac{1}{3} \cdot \frac{9}{2} = \frac{3}{2} = 1\frac{1}{2}$$

Think and Discuss

1. Explain why in a multiplication problem you need to write mixed numbers as improper fractions in order to multiply.

2. Explain using Problem 1, why $2 \cdot \frac{3}{8}$ is equal to $\frac{3}{8} + \frac{3}{8}$.

3. How do you write any whole number as a fraction?

Name _____ Date _____ Class _____

LESSON 3-11

Practice A

Dividing Fractions and Mixed Numbers

Divide. Write each answer in simplest form.

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

2. $9 \div \frac{1}{3}$ _____

3. $6 \div \frac{1}{4}$ _____

4. $3 \div \frac{3}{4}$ _____

5. $10 \div \frac{5}{6}$ _____

6. $6 \div \frac{3}{8}$ _____

Divide. Find each quotient in the box.

$\frac{1}{5}$	$\left(-\frac{1}{4}\right)$	$\frac{1}{2}$	$\left(-\frac{6}{11}\right)$	$\frac{5}{7}$	$\frac{7}{8}$	1	$1\frac{1}{2}$	2	$2\frac{6}{7}$	3	4	$5\frac{1}{3}$	$7\frac{1}{2}$

7. $\frac{9}{5} \div \frac{3}{5}$ _____

8. $\frac{6}{7} \div \frac{3}{7}$ _____

9. $\frac{1}{6} \div \frac{5}{6}$ _____

10. $\frac{1}{3} \div \frac{2}{3}$ _____

11. $\frac{3}{4} \div \frac{1}{2}$ _____

12. $\frac{1}{6} \div \left(-\frac{2}{3}\right)$ _____

13. $2\frac{2}{3} \div \frac{1}{2}$ _____

14. $1\frac{1}{4} \div \frac{1}{6}$ _____

15. $2\frac{1}{2} \div \frac{7}{8}$ _____

16. $2\frac{1}{2} \div 3\frac{1}{2}$ _____

17. $1\frac{1}{6} \div 1\frac{1}{3}$ _____

18. $\left(-1\frac{1}{5}\right) \div 2\frac{1}{5}$ _____

19. A restaurant sells 3 sizes of soup. The medium is 8 ounces more than the small, and the large is twice as much as the medium. The large soup is 40 ounces. How many ounces is the small soup?

_____

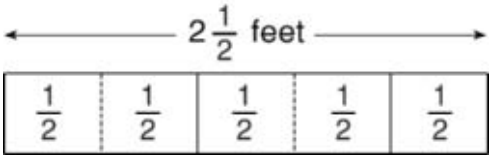
Name _____ Date _____ Class _____

LESSON 3-11

Reading Strategies

Use a Visual Model

The Smith family has a two-and-a-half-foot-long sandwich to share. One-half foot of the sandwich will serve one person. How many one-half foot servings are in this sandwich?



Use the model to answer each question.

1. How long is the sandwich?

   _____

2. How long is each serving?

   _____

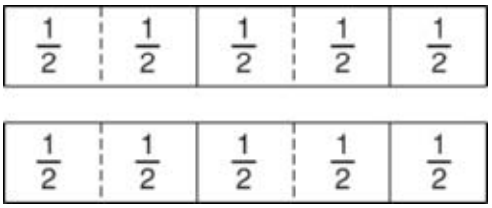
3. If you divided the sandwich into $\frac{1}{2}$ ft servings, how many would you have?

   _____

4. What is $2\frac{1}{2} \div \frac{1}{2}$?

   _____

Suppose you have two sandwiches.



5. How many feet are in both sandwiches?

   _____

6. What is $2\frac{1}{2} \times 2$?

   _____

7. Compare the answers to $2\frac{1}{2} \div \frac{1}{2}$ and $2\frac{1}{2} \times 2$. What do you notice?

   _____

Name _____ Date _____ Class _____

LESSON 3-11

Review for Mastery

Dividing Fractions and Mixed Numbers

Dividing fractions and mixed numbers is very much like multiplying fractions and mixed numbers. Just follow these steps:

> **Step 1:** Write any mixed numbers as improper fractions.
> **Step 2:** Invert the divisor.
> **Step 3:** Multiply and write the quotient in simplest form.

Divide: $1\frac{1}{8} \div \frac{1}{3}$

Step 1: $1\frac{1}{8} \div \frac{1}{3} = \frac{9}{8} \div \frac{1}{3}$

Step 2: $\frac{9}{8} \div \frac{1}{3} = \frac{9}{8} \bullet \frac{3}{1}$

Step 3: $\frac{9}{8} \bullet \frac{3}{1} = \frac{27}{8} = 3\frac{3}{8}$

Divide: $1\frac{1}{4} \div 3\frac{1}{3}$

Step 1: $1\frac{1}{4} \div 3\frac{1}{3} = \frac{5}{4} \div \frac{10}{3}$

Step 2: $\frac{5}{4} \div \frac{10}{3} = \frac{5}{4} \bullet \frac{3}{10}$

Step 3: $\frac{5}{4} \bullet \frac{3}{10} = \frac{15}{40} = \frac{3}{8}$

Divide. Write each answer in simplest form.

1. $\frac{4}{5} \div \frac{1}{2} = \frac{4}{5} \bullet \_\_\_\_ = \_\_\_\_ = \_\_\_\_$

2. $\frac{5}{8} \div \frac{5}{6} = \frac{5}{8} \bullet \_\_\_\_ = \_\_\_\_ = \_\_\_\_$

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

   $= \_\_\_\_ = \_\_\_\_ = \_\_\_\_$

4. $2\frac{2}{3} \div 1\frac{1}{5} = \frac{\_}{3} \div \frac{\_}{5} = \frac{\_}{3} \bullet \_\_\_\_$

   $= \_\_\_\_ = \_\_\_\_ = \_\_\_\_$

5. $\frac{3}{5} \div \frac{3}{10}$

   _____

6. $\frac{7}{8} \div \frac{1}{3}$

   _____

7. $\frac{5}{12} \div \frac{1}{2}$

   _____

8. $4\frac{1}{3} \div 1\frac{1}{9}$

   _____

9. $2\frac{1}{3} \div 1\frac{3}{4}$

   _____

10. $5\frac{5}{8} \div 2\frac{1}{2}$

    _____

Name _____ Date _____ Class _____

LESSON 3-11

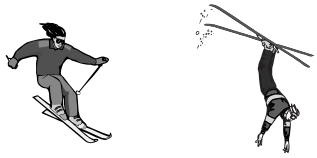
Student Worksheet

Dividing Fractions and Mixed Numbers

Problem 1

What is the reciprocal of $\frac{6}{7}$?

$\frac{6}{7}$ *FLIP* $\frac{7}{6}$



$$\frac{6}{7} \cdot \frac{7}{6} = \frac{\cancel{6}}{\cancel{7}} \cdot \frac{\cancel{7}}{\cancel{6}} = 1$$

Wow! The product is 1.

Problem 2

Divide 9 by $1\frac{1}{2}$.

$9 \div 1\frac{1}{2}$

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

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

$9 \cdot \frac{2}{3}$

$$\frac{9}{1} \cdot \frac{2}{3} = \frac{18}{3} = \frac{6}{1} = 6$$

Think and Discuss

1. How is dividing fractions DIFFERENT from multiplying fractions?

_____

2. What is the first step in dividing by mixed numbers?

_____

3-11 Exercises

Homework Help — THINK central
Go to thinkcentral.com
Exercises 1–27, 29, 31, 33, 41

MA.7.A.3.2, MA.7.A.5.2

GUIDED PRACTICE

See Example 1 — **Divide. Write each answer in simplest form.**

1. $6 \div \frac{1}{3}$
2. $\frac{3}{5} \div \frac{3}{4}$
3. $\frac{3}{4} \div 8$
4. $-\frac{5}{9} \div \frac{2}{5}$

See Example 2

5. $\frac{5}{6} \div 3\frac{1}{3}$
6. $5\frac{5}{8} \div 4\frac{1}{2}$
7. $10\frac{4}{5} \div 5\frac{2}{5}$
8. $2\frac{1}{10} \div \frac{3}{5}$

See Example 3

9. Kareem has three choices of fabric to make a cape for a play. He has $1\frac{1}{2}$ times as much blue fabric as red fabric, and he has $\frac{1}{4}$ more yard of purple fabric than blue fabric. If Kareem has $4\frac{1}{2}$ yards of purple fabric, how much red fabric does he have?

INDEPENDENT PRACTICE

See Example 1 — **Divide. Write each answer in simplest form.**

10. $2 \div \frac{7}{8}$
11. $10 \div \frac{5}{9}$
12. $\frac{3}{4} \div \frac{6}{7}$
13. $\frac{7}{8} \div \frac{1}{5}$
14. $\frac{8}{9} \div \frac{1}{4}$
15. $\frac{4}{9} \div 12$
16. $\frac{9}{10} \div 6$
17. $-16 \div \frac{2}{5}$

See Example 2

18. $\frac{7}{11} \div 4\frac{1}{5}$
19. $\frac{3}{4} \div 2\frac{1}{10}$
20. $22\frac{1}{2} \div 4\frac{2}{7}$
21. $-10\frac{1}{2} \div \frac{3}{4}$
22. $3\frac{5}{7} \div 9\frac{1}{7}$
23. $14\frac{2}{3} \div 1\frac{1}{6}$
24. $7\frac{7}{10} \div 2\frac{2}{5}$
25. $8\frac{2}{5} \div \frac{7}{8}$

See Example 3

26. A juice punch contains orange juice, cranberry juice, and pineapple juice. The amount of cranberry juice is $\frac{1}{2}$ the amount of orange juice, and there is $\frac{3}{4}$ cup more pineapple juice than cranberry juice. If there are $2\frac{1}{2}$ cups of pineapple juice, how much orange juice does the punch contain?
27. Three friends are meeting at an amusement park. Luke is driving $4\frac{2}{3}$ times as far as Rose, and Ben is driving $2\frac{3}{4}$ miles farther than Luke. If Ben is driving $13\frac{1}{4}$ miles, how far is Rose driving?

PRACTICE AND PROBLEM SOLVING

Evaluate. Write each answer in simplest form.

28. $6\frac{2}{3} \div \frac{7}{9}$
29. $-1\frac{7}{11} \div \left(\frac{9}{11}\right)$
30. $\frac{2}{3} \div \frac{8}{9}$
31. $-1\frac{3}{5} \div 2\frac{1}{2}$
32. $\frac{1}{2} \div 4\frac{3}{4}$
33. $\left(2\frac{3}{4} + 3\frac{2}{3}\right) \div \frac{11}{18}$
34. $\left(\frac{1}{2} + \frac{2}{3}\right) \div 1\frac{1}{2}$
35. $\frac{1}{2}\left(\frac{3}{5} - \frac{2}{15}\right) + \frac{2}{9} \div \frac{1}{3}$
36. $\frac{3}{7} \div \frac{15}{28} \div \left(-\frac{4}{5}\right)$
37. $\frac{7}{8} \div 2\frac{1}{10}$
38. $\frac{2}{3} \div \left(\frac{5}{6} + \frac{1}{12}\right) - 2 \cdot \frac{1}{2}$
39. $\frac{3}{4} + \frac{3}{20} \div \frac{2}{5} \cdot \frac{7}{8} - 1$
40. $\left(\frac{1}{2}\right)^2 + \frac{1}{3} \div \frac{1}{6} - \frac{1}{4}$

41. **Multi-Step** How many $\frac{1}{4}$ lb hamburger patties can be made from a $10\frac{1}{4}$ lb package and an $11\frac{1}{2}$ lb package of ground meat?

42. **Write About It** Explain what it means to divide $\frac{2}{3}$ by $\frac{1}{3}$. Use a model.

= WORKED-OUT SOLUTIONS on p. WS5

Industrial Arts LINK

43. Multi-Step The students in Mr. Park's woodworking class are making birdhouses. The plans call for the side pieces of the birdhouses to be $7\frac{1}{4}$ inches long. If Mr. Park has 6 boards that are $50\frac{3}{4}$ inches long, how many side pieces can be cut?

44. Critical Thinking Brandy is stamping circles from a strip of aluminum. If each circle is $1\frac{1}{4}$ inches tall, how many circles can she get from an $8\frac{3}{4}$-inch by $1\frac{1}{4}$-inch strip of aluminum?

45. Mrs. Anwar's third-period industrial arts class took $1\frac{1}{4}$ times as long to complete their final projects as her second-period class. Her second-period class took $3\frac{1}{2}$ hours more than her first-period class. If her first-period class took $8\frac{1}{2}$ hours to complete their final projects, how much time did it take her third-period class to finish?

46. For his drafting class, Manuel is drawing plans for a bookcase. Because he wants his drawing to be $\frac{1}{4}$ the actual size of the bookcase, Manuel must divide each measurement of the bookcase by 4. If the bookcase will be $3\frac{2}{3}$ feet wide, how wide will Manuel's drawing be?

47. Challenge Alexandra is cutting wood stencils to spell her first name with capital letters. Her first step is to cut a square of wood that is $3\frac{1}{2}$ in. long on a side for each letter in her name. Will Alexandra be able to make all of the letters of her name from a single piece of wood that is $7\frac{1}{2}$ in. wide and 18 in. long? Explain your answer.

Florida Spiral Review

MA.7.A.3.2

48. Multiple Choice Which expression is NOT equivalent to $2\frac{2}{3} \div 1\frac{5}{8}$?

A. $\frac{8}{3} \cdot \frac{8}{13}$ B. $2\frac{2}{3} \div \frac{13}{8}$ C. $\frac{8}{3} \div \frac{13}{8}$ D. $\frac{8}{3} \cdot 1\frac{5}{8}$

49. Multiple Choice What is the value of the expression $\frac{3}{5} \cdot \frac{1}{6} \div \frac{2}{5}$?

F. $\frac{1}{25}$ G. $\frac{1}{4}$ H. $\frac{15}{22}$ I. 25

50. Gridded Response Each cat at the animal shelter gets $\frac{3}{4}$ c of food every day. If Alysse has $16\frac{1}{2}$ c of cat food, how many cats can she feed?

Divide. (Lesson 3-5)

51. $74.25 \div 6.6$ **52.** $-231.28 \div (-41.3)$ **53.** $-36.04 \div 4.24$ **54.** $-17 \div -1.7$

Multiply. Write each answer in simplest form. (Lesson 3-10)

55. $-\frac{2}{15} \cdot \frac{5}{8}$ **56.** $1\frac{7}{20} \cdot 6$ **57.** $1\frac{2}{7} \cdot 2\frac{3}{4}$ **58.** $\frac{1}{8} \cdot 6 \cdot 2\frac{5}{9}$

Name _____ Date _____ Class _____

LESSON 1-3

Practice A

Properties of Numbers

Tell which property is shown.

1. $5 + 0 = 5$

   _____

2. $8 \cdot (6 \cdot 2) = (8 \cdot 6) \cdot 2$

   _____

3. $9 + 8 = 8 + 9$

   _____

4. $4 \cdot 1 = 4$

   _____

Simplify each expression. Write a reason for each step.

5. $13 + 28 + 7$

   $13 + 28 + 7 = 28 + 13 + 7$ Reason: Commutative Property

   $= 28 + (13 + 7)$ Reason: _____

   $= 28 +$ _____ Reason: Add.

   $=$ _____ Reason: _____

6. $20 \cdot (17 \cdot 5)$

   $20 \cdot (17 \cdot 5) = 20 \cdot ($_____ $\cdot 17)$ Reason: _____

   $= (20 \cdot$ _____$) \cdot 17$ Reason: _____

   = _____ • _____ Reason: Multiply.

   = _____ Reason: _____

Use the Distributive Property to find each product.

7. $4(17)$

   $4(17) = 4 \cdot (10 +$ _____$)$

   $= (4 \cdot$ _____$) + (4 \cdot 7)$

   = _____ + _____

   = _____

8. $3(28)$

   $3(28) =$ _____

   = _____

   = _____

   = _____

Name _____ Date _____ Class _____

LESSON 1-3

Reading Strategies

Use a Flowchart

Use a flowchart to help you simplify an expression, such as $(25 + 89) + 15$.

Step 1: Choose two numbers that are easy to add.
$(\mathbf{25} + 89) + \mathbf{15}$

↓

Step 2: Rewrite the expression so the two numbers are next to each other.
Use the Commutative Property. $(\mathbf{25} + 89) + \mathbf{15} = (89 + \mathbf{25}) + \mathbf{15})$

↓

Step 3: Rewrite the expression so the two numbers are grouped together.
Use the Associative Property. $(89 + \mathbf{25}) + \mathbf{15} = 89 + (\mathbf{25} + \mathbf{15})$

↓

Step 4: Add.
$89 + (\mathbf{25} + \mathbf{15}) = 89 + \mathbf{40} = 129$

Use the expression $16 + (39 + 14)$ for Exercises 1–4.

1. Which two numbers are easy to add? _____
2. Rewrite the expression so that the numbers that are easy to add are next to each other. What property lets you do this?

   _____
3. Rewrite the expression so that the numbers that are easy to add are grouped together. What property lets you do this?

   _____
4. Simplify the expression. _____

Use the expression $35 + 47 + 5$ for Exercises 5–8.

5. Which two numbers are easy to add? _____
6. Rewrite the expression so that the numbers that are easy to add are next to each other. What property lets you do this?

   _____
7. Rewrite the expression so that the numbers that are easy to add are grouped together. What property lets you do this?

   _____
8. Simplify the expression. _____

Name _____ Date _____ Class _____

LESSON 1-3

Review for Mastery

Properties of Numbers

You can use the Commutative Property, the Associative Property, and the Distributive Property with mental math to simplify expressions.

16 + **47** + 14 = **47** + **16** + 14	Commutative Property	**8** • **3** • 5 = **3** • **8** • 5
= 47 + (16 + 14)	Associative Property	= 3 • (8 • 5)
= 47 + 30	Mental math	= 3 • 40
= 77	Mental math	= 120
9(**28**) = 9(**20** + **8**)		9(**28**) = 9(**30** – **2**)
= (**9** • 20) + (**9** • 8)	Distributive Property	= (**9** • 30) – (**9** • 2)
= 180 + 72	Mental math	= 270 – 18
= 252	Mental math	= 252

Simplify each expression. Tell what properties you used.

1. (45 + 39) + 25 = (39 + _____) + 25 _____ Property
   = 39 + (_____ + _____) _____ Property
   = 39 + _____
   = _____

2. 25 • 7 • 4 = 25 • _____ • _____ _____ Property
   = (_____ • _____) • _____ _____ Property
   = _____ • _____
   = _____

3. 5(18) = 5 • (10 + _____)
   = (5 • _____) + (5 • _____)
   = _____ + _____
   = _____
   _____ Property

4. 6(29) = 6 • (30 – _____)
   = (6 • _____) – (6 • _____)
   = _____ – _____
   = _____
   _____ Property

Name _____ Date _____ Class _____

LESSON 1-3

Student Worksheet

Properties of Numbers

Problem 1

Properties	
Commutative	
Add any order	3 + 8 = 8 + 3
Multiply any order	5 • 7 = 7 • 5
Associative	
Add any group	(4 + 5) + 1 = 4 + (5 + 1)
Multiply any group	(9 • 2) • 6 = 9 • (2 • 6)
Identity	
Add 0, sum is number	4 + 0 = 4
Multiply by 1, product is number	8 • 1 = 8

Problem 2

Use Distributive Property to find 7(29)	
Method 1: 7(29)	= 7 • (20 + 9) **Regroup**
	= 7 • 20 = 140 **Multiply**
	= 7 • 9 = 63
	= 140 + 63 **Add**
	So, 7(29) = 203
Method 2: 7(29)	= 7 • (30 − 1) **Rewrite**
	= 7 • 30 = 210 **Multiply**
	= 7 • 1 = 7
	= 210 − 7 **Subtract**
	So, 7(29) = 203

Which is easier for you, Method 1 or Method 2?

Think and Discuss

1. What is 25 • 1? Which property is represented?

_____

2. Complete the expression 2 + (7 + 8) = (2 + 7) + □. How do you know this is the Associative Property?

_____

3. Find 6 • (9 + 14).

_____

Name _____ Date _____ Class_____

LESSON 1-8

Practice A

Solving Equations by Adding or Subtracting

Match each equation in Column A with its correct solution in Column B.

Column A	Column B	Column A	Column B
1. $n - 16 = 8$	A. $n = 12$	10. $x - 12 = 13$	L. $x = 14$
2. $5 = n - 7$	B. $n = 13$	11. $x + 8 = 40$	M. $x = 17$
3. $12 + n = 25$	C. $n = 17$	12. $34 = 16 + x$	N. $x = 18$
4. $n - 17 = 11$	D. $n = 24$	13. $x + 5 = 19$	P. $x = 25$
5. $n + 18 = 35$	E. $n = 27$	14. $4 + x = 52$	Q. $x = 32$
6. $7 = n - 28$	F. $n = 28$	15. $12 + x = 50$	R. $x = 33$
7. $n - 12 = 40$	G. $n = 35$	16. $15 = x - 2$	S. $x = 38$
8. $24 = n - 25$	H. $n = 49$	17. $52 = x + 9$	T. $x = 43$
9. $46 = n + 19$	J. $n = 52$	18. $x - 11 = 22$	U. $x = 48$

19. Chris has 55 baseball trading cards. He has 17 more cards than his sister Sara has. Write and solve an equation to find how many trading cards Sara has.

_____

20. In 2008, Miguel Cabrera hit 37 home runs. His home run total was 11 fewer than the number of home runs that Ryan Howard hit the same year. Write and solve an equation to find how many home runs Ryan Howard hit in 2008.

_____

Name _____ Date _____ Class_____

LESSON 1-8

Reading Strategies

Follow a Procedure

In order to solve an equation, you must find a **solution.** A solution is a value of the variable that makes the equation true. To solve an equation, you need to get the variable by itself on one side of the equal sign.

- If you have an addition equation, you must subtract to get the variable by itself.
- If you have a subtraction equation, you must add to get the variable by itself.

Example:

$z + 12 = 32$	←	To get z by itself, subtract 12.
$z + 12 - \mathbf{12} = 32 - \mathbf{12}$	←	Rewrite the equation to show that 12 is subtracted from both sides.
$z = 20$	←	This is the solution after subtracting 12 from both sides.

Check by using 12 in place of z.

$20 + 12 \stackrel{?}{=} 32$

$32 = 32$, so $z = 20$ is the correct solution.

Example:

$27 = x - 8$	←	To get x by itself, add 8.
$27 + \mathbf{8} = x - 8 + \mathbf{8}$	←	Rewrite the equation to show that 8 is added to both sides.
$35 = x$	←	This is the solution after adding 8 to both sides.

Check by using 35 in place of x.

$27 \stackrel{?}{=} 35 - 8$

$27 = 27$, so $x = 35$ is the correct solution.

Use $m + 17 = 43$ for Exercises 1–4.

1. What operation is shown in this equation? _____
2. What operation will you use to get m by itself? _____
3. Rewrite the equation showing subtracting from both sides of the equation. _____
4. What is the value of m? _____

Name _____ Date _____ Class_____

LESSON 1-8

Review for Mastery

Solving Equations by Adding or Subtracting

Solving an equation is like balancing a scale. If you add the same weight to both sides of a balanced scale, the scale will remain balanced. You can use this same idea to solve an equation.

Think of the equation $x - 7 = 12$ as a balanced scale. The equal sign keeps the balance.

$-7 + 7 = 0$

$$\begin{aligned} x - 7 &= 12 \\ x - 7 + \mathbf{7} &= 12 + \mathbf{7} && \text{Add 7 to both sides.} \\ x + 0 &= 19 && \text{Combine like terms.} \\ x &= 19 \end{aligned}$$

When you solve an equation, the idea is to get the variable by itself. What you do to one side of the equation, you must do to the other side.

- To solve a subtraction equation, use addition.
- To solve an addition equation, use subtraction.

Solve and check: $y + 8 = 14$.

$+8 - 8 = 0$

$$\begin{aligned} y + 8 &= 14 \\ y + 8 - \mathbf{8} &= 14 - \mathbf{8} && \text{Subtract 8 from both sides.} \\ y + 0 &= 6 && \text{Combine like terms.} \\ y &= 6 \end{aligned}$$

Check: $y + 8 = 14$ To check, substitute 6 for y.

$6 + 8 \stackrel{?}{=} 14$

$14 = 14$

A true sentence, $14 = 14$, means the solution is correct.

Solve and check.

1. $x - 2 = 8$

$x - 2 + \_\_\_\_\_ = 8 + \_\_\_\_\_$

$x - 0 = \_\_\_\_\_$

2. $b + 5 = 11$

$b + 5 - \_\_\_\_\_ = 11 - \_\_\_\_\_$

$b + 0 = \_\_\_\_\_$

3. $n + 8 = 11$ _____

4. $y - 6 = 2$ _____

5. $a - 9 = 4$ _____

6. $m + 2 = 18$ _____

Name _____ Date _____ Class _____

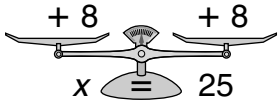
LESSON 1-8

Student Worksheet

Solving Equations by Adding or Subtracting

Problem 1

$x - 8 = 17$
$+ 8 \quad + 8$



$x = 25$

Equations must stay balanced—with both sides equal.

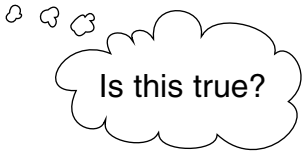
If a number is added to one side of an equation, the same number **must** be added to the other side.

Check:

$x - 8 = 17$
$25 - 8 \stackrel{?}{=} 17$

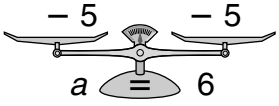
Substitute $x = 25$.

Subtraction Property of Equality



Problem 2

$a + 5 = 11$
$- 5 \quad - 5$



$a = 6$

Equations must stay balanced—with both sides equal.

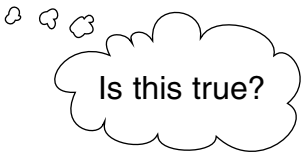
If a number is subtracted from one side of an equation, the same number **must** be subtracted from the other side.

Check:

$a + 5 = 11$
$6 + 5 \stackrel{?}{=} 11$

Substitute $a = 6$.

Addition Property of Equality



Think and Discuss

1. Is $x = 25$ a solution to $x - 8 = 17$? Explain.

_____

2. Why is 5 subtracted from both sides of the equation in Problem 2? What property is used?

_____

3. How do you know that $a = 6$ is a solution to $a + 5 = 11$?

_____

Name _____ Date _____ Class_____

LESSON 1-9

Practice A

Solving Equations by Multiplying or Dividing

Solve.

1. $16 = n \div 2$ _____
2. $\frac{e}{10} = 8$ _____
3. $25 = \frac{x}{6}$ _____
4. $18 = \frac{d}{3}$ _____
5. $a \div 12 = 7$ _____
6. $30 = b \div 4$ _____

Solve and check.

7. $7w = 49$ _____
8. $75 = 3x$ _____
9. $60 = 12p$ _____
10. $77 = 11m$ _____
11. $4h = 48$ _____
12. $9y = 54$ _____
13. $2x = 30$ _____
14. $45 = 5s$ _____
15. $6z = 42$ _____

16. The Fruit Stand charges $0.50 each for navel oranges. Kareem paid $4.00 for a large bag of navel oranges. How many oranges did he buy?

_____

17. Jenny can type at a speed of 80 words per minute. It took her 20 minutes to type a report. How many words was the report?

_____

18. At the local gas station, regular unleaded gasoline is priced at $2.50 per gallon. If it cost $37.50 to fill a car's gas tank, how many gallons of gasoline were purchased?

_____

Name _____ Date _____ Class _____

LESSON 1-9

Reading Strategies

Follow a Procedure

The opposite of multiplication is division: ⟶ $12 \cdot 3 = 36$, and $36 \div 3 = 12$

The opposite of division is multiplication: ⟶ $48 \div 12 = 4$, and $4 \cdot 12 = 48$

From these examples you can see that:

division "undoes" multiplication, and **multiplication "undoes" division.**

To solve multiplication and division equations:

- Get the variable by itself on one side of the equation.
- Keep the equation in balance by using the same operation on both sides.

Example:

$84 = 7x$ ⟵ Get the variable by itself. This is a multiplication equation, so divide to "undo" the multiplication.

$\frac{84}{7} = \frac{7x}{7}$ ⟵ Rewrite the equation to show that both sides are divided by 7.

$12 = x$ ⟵ This is the solution after dividing both sides by 7.

Check using 12 in place of x:

$84 \stackrel{?}{=} 7(12)$

$84 = 84$, so $x = 12$ is the solution.

Example:

$\frac{m}{15} = 8$ ⟵ Get the variable by itself. Multiply to "undo" division.

$\frac{m}{15} \cdot 15 = 8 \cdot 15$ ⟵ Rewrite the equation to show that both sides are multiplied by 15.

$m = 120$ ⟵ This is the solution after multiplying both sides by 15.

Check by using 120 in place of m.

$\frac{120}{15} \stackrel{?}{=} 8$

$8 = 8$, so $m = 120$ is the solution.

Use $108 = 9y$ for Exercises 1–3.

1. What operation will you use to solve the equation?

   _____

2. Rewrite the equation using the inverse operation on both sides.

   _____

3. What is the value of y?

   _____

Name _____ Date _____ Class _____

LESSON 1-9

Review for Mastery

Solving Equations by Multiplying or Dividing

When you solve an equation, you must get the variable by itself. Remember, what you do to one side of an equation, you must do to the other side.

- To solve a division equation, multiply both sides of the equation by the same number.

Solve and check: $\frac{a}{3} = 4$.

$\frac{3a}{3} = 1a = a$

$\frac{a}{3} = 4$

$(3)\frac{a}{3} = 4(3)$

$a = 12$

Multiply to solve a division equation.

Check: $\frac{a}{3} = 4$

$\frac{12}{3} \stackrel{?}{=} 4$

$4 \stackrel{?}{=} 4$ ✔

Replace the variable with the solution.

A true sentence means the solution is correct.

Solve and check.

1. $\frac{x}{6} = 3$
2. $\frac{s}{8} = 8$
3. $\frac{c}{10} = 7$
4. $\frac{n}{3} = 12$

_____ _____ _____ _____

- To solve a multiplication equation, divide both sides of the equation by the same number.

Solve and check: $5k = 30$.

$\frac{5k}{5} = 1k = k$

$5k = 30$

$\frac{5k}{5} = \frac{30}{5}$

$k = 6$

Divide to solve a multiplication equation.

Check: $5k = 30$

$5(6) \stackrel{?}{=} 30$

$30 \stackrel{?}{=} 30$ ✔

Replace the variable with the solution.

True

Solve and check.

5. $2w = 16$
6. $4b = 24$
7. $9z = 45$
8. $10m = 40$

_____ _____ _____ _____

Name _____ Date _____ Class _____

LESSON 1-9

Student Worksheet

Solving Equations by Multiplying or Dividing

Problem 1

$\frac{x}{7} = 20$

$\frac{7}{1} \cdot \frac{x}{7} = 20 \cdot 7$

$x = 140$

x is being divided by 7. To isolate *x,* use the inverse operation: **MULTIPLY BOTH SIDES BY 7.**

Check:

Does $\frac{x}{7} = 20$ when $x = 140$?

$\frac{140}{7} \stackrel{?}{=} 20$ Subtitute $x = 140$.

$20 = 20$ ✔

Problem 2

$240 = 4z$

$\frac{240}{4} = \frac{4z}{4}$

$60 = z$

z is multiplied by 4. To isolate *z,* use the inverse operation: **DIVIDE BOTH SIDES BY 4.**

Think and Discuss

1. Why is 7 multiplied to both sides in Problem 1?

_____

2. Is $z = 60$ a solution to the equation $240 = 4z$? Explain.

_____

_____

Name _____ Date _____ Class _____

LESSON 2-5

Practice A

Solving Equations Containing Integers

Solve each equation. Check your answer.

1. $n - 6 = -2$ _____
2. $x - 8 = -11$ _____
3. $7 = a - 5$ _____
4. $y + 4 = 2$ _____
5. $c + 7 = -3$ _____
6. $0 = v + 1$ _____
7. $8j = -16$ _____
8. $-3k = 24$ _____
9. $-20 = -4s$ _____
10. $\frac{m}{-2} = -5$ _____
11. $\frac{d}{6} = -3$ _____
12. $\frac{r}{-7} = 4$ _____
13. $p + 8 = -6$ _____
14. $-15 = 5b$ _____
15. $f - 9 = -1$ _____
16. $\frac{n}{6} = -4$ _____
17. $k + 10 = 3$ _____
18. $4a = -16$ _____
19. $-6x = -36$ _____
20. $2 = e - 7$ _____
21. $3 = \frac{m}{2}$ _____

22. The temperature in Minnesota was –8 °F one day. This was 12 degrees less than the temperature in Indiana on the same day. What was the temperature in Indiana?

_____

23. Mr. Harding sold 100 shares of stock at $14 per share. He had a loss of $6 per share. What did Mr. Harding pay for each share of the stock?

_____

Name _____ Date _____ Class _____

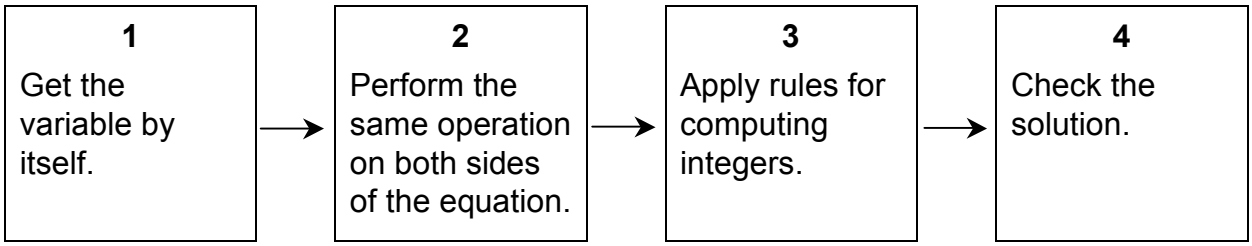
LESSON 2-5

Reading Strategies

Use a Flowchart

The rules for solving equations with integers are the same as with whole numbers.

Use a flowchart to help you follow the rules.



$x + 12 = 5$ ⟶ Get x by itself.

$x + 12 - \mathbf{12} = 5 - \mathbf{12}$ ⟶ Subtract 12 from both sides.

$x = \mathbf{5} + (-\mathbf{12})$ ⟶ Add the opposite.

$x = -7$

$x + 12 = 5$ ⟶ Check.

$-7 + 12 \stackrel{?}{=} 5$

$5 = 5$

Use $w - 12 = (-4)$ to answer Exercises 1–4.

1. What operation is used in this equation?

   _____

2. What operation will you use to get the variable by itself?

   _____

3. Apply this operation to both sides of the equation.

   _____

4. What is the value of w?

   _____

Use $x + (-9) = (-4)$ to answer Exercises 5 and 6.

5. What operation is used in this problem?

   _____

6. What operation will you use to get x by itself?

   _____

Name _____ Date _____ Class _____

LESSON 2-5

Review for Mastery

Solving Equations Containing Integers

- You can use addition to solve an equation involving subtraction.

  Addition undoes subtraction. Adding the same number to both sides of the equation keeps the equation balanced.

	Check
$x - 5 = -6$	$x - 5 = -6$
$x - 5 + 5 = -6 + 5$	$-1 - 5 \stackrel{?}{=} -6$
$x = -1$	$-6 \stackrel{?}{=} -6$ ✓

- You can use subtraction to solve an equation involving addition.

  Subtraction undoes addition. Subtracting the same number from both sides of the equation keeps the equation balanced.

	Check
$n + 4 = -15$	$n + 4 = -15$
$n + 4 - 4 = -15 - 4$	$-19 + 4 \stackrel{?}{=} -15$
$n = -19$	$-15 \stackrel{?}{=} -15$ ✓

Solve. Check your answer.

1. $p - 9 = -3$

   $p - 9 + \_\_\_\_ = -3 + \_\_\_\_$

   _____

2. $w - 2 = -14$

   $w - 2 + \_\_\_\_ = -14 + \_\_\_\_$

   _____

3. $x - 12 = -5$

   $x - 12 + \_\_\_\_ = -5 + \_\_\_\_$

   _____

4. $f - 8 = 6$

   $f - 8 + \_\_\_\_ = 6 + \_\_\_\_$

   _____

5. $6 = m - 7$

   _____

6. $-4 = s - 10$

   _____

7. $-8 = y - 2$

   _____

8. $a + 19 = 7$

   _____

9. $b + 15 = -9$

   _____

10. $39 + t = 45$

    _____

11. $-5 = x + 7$

    _____

12. $-2 = k + 11$

    _____

13. $10 = -3 + j$

    _____

Name _____ Date _____ Class _____

LESSON 2-5

Review for Mastery

Solving Equations Containing Integers (continued)

- You can use division to solve an equation involving multiplication.

  Division undoes multiplication. Dividing both sides of the equation by the same number keeps the equation balanced.

Check

$3y = -9$

$\frac{3y}{3} = \frac{-9}{3}$

$y = -3$

$3y = -9$

$3 \cdot (-3) \stackrel{?}{=} -9$

$-9 \stackrel{?}{=} -9$ ✓

- You can use multiplication to solve an equation involving division.

  Multiplication undoes division. Multiplying both sides of an equation by the same number keeps the equation balanced.

Check

$\frac{a}{-5} = -8$

$-5 \cdot \frac{a}{-5} = -8 \cdot (-5)$

$a = 40$

$\frac{a}{-5} = -8$

$\frac{40}{-5} \stackrel{?}{=} -8$

$-8 \stackrel{?}{=} -8$ ✓

Solve. Check your answer.

14. $5g = -35$

$\frac{5g}{\quad} = \frac{-35}{\quad}$

_____

15. $-8y = -96$

$\frac{-8y}{\quad} = \frac{-96}{\quad}$

_____

16. $54 = -6f$

$\frac{54}{\quad} = \frac{-6f}{\quad}$

_____

17. $3e = -33$

_____

18. $-49 = 7n$

_____

19. $-75 = -5c$

_____

20. $\frac{n}{4} = -15$

_____

21. $\frac{m}{-6} = -9$

_____

22. $\frac{s}{-10} = 8$

_____

23. $4 = \frac{w}{-6}$

_____

24. $9 = \frac{z}{5}$

_____

25. $-11 = \frac{h}{6}$

_____

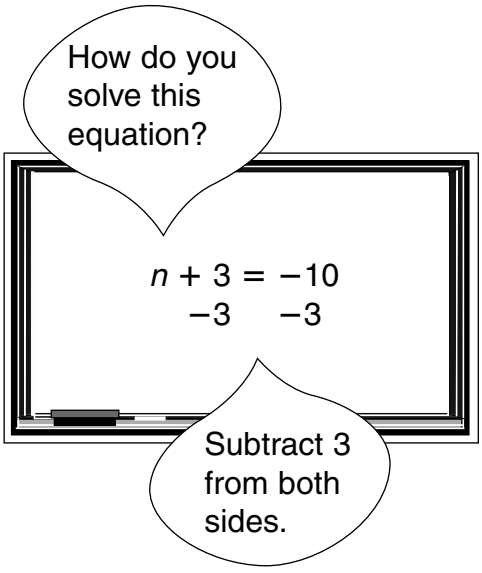
Name _____ Date _____ Class _____

LESSON 2-5

Student Worksheet

Solving Equations Containing Integers

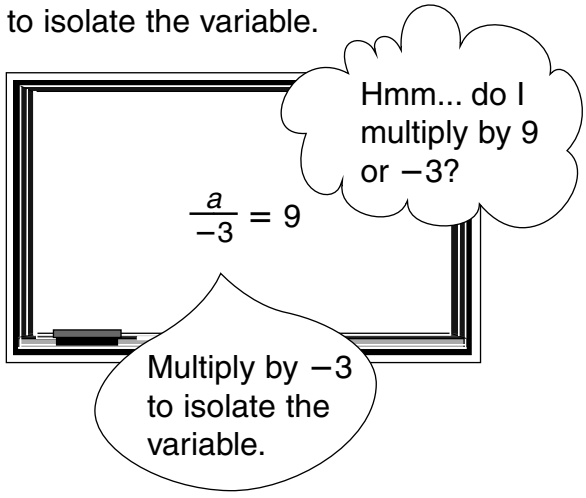
Problem 1



The solution to the equation is $n = -13$.

Problem 2

Sometimes you need to multiply both sides by a number in order to isolate the variable.



The solution to the equation is $a = -27$.

Think and Discuss

1. In Problem 1, what is the variable? _____

2. How do you "undo" the addition to isolate n in Problem 1?

_____

3. Explain what it means that $n = -13$ is a solution to $n + 3 = -10$.

_____

Remember… A number plus its opposite is zero.
$6 + (-6) = 0$

4. When is $n + 1$ equal to zero? _____

5. When is $n - 1$ equal to zero? _____

6. When is $-n + 1$ equal to zero? _____

7. When is $-n - 1$ equal to zero? _____

2-5 Exercises

Homework Help — THINK central
Go to thinkcentral.com
Exercises 1–20, 23, 25, 31, 33, 35, 37, 43

MA.7.A.3.3
MA.7.A.3.4

GUIDED PRACTICE

Solve each equation. Check your answer.

See Example 1
1. $w - 6 = -2$
2. $x + 5 = -7$
3. $k = -18 + 11$

See Example 2
4. $\frac{n}{-4} = 2$
5. $-240 = 8y$
6. $-5a = 300$

See Example 3
7. **Business** Last year, a chain of electronics stores had a loss of $45 million. This year the loss is $12 million more than last year's loss. What is this year's loss?

INDEPENDENT PRACTICE

Solve each equation. Check your answer.

See Example 1
8. $b - 7 = -16$
9. $k + 6 = 3$
10. $s + 2 = -4$
11. $v + 14 = 10$
12. $c + 8 = -20$
13. $a - 25 = -5$

See Example 2
14. $9c = -99$
15. $\frac{t}{8} = -4$
16. $-16 = 2z$
17. $\frac{n}{-5} = -30$
18. $200 = -25p$
19. $\frac{\ell}{12} = 12$

See Example 3
20. The temperature in Nome, Alaska, was −50 °F. This was 18 °F less than the temperature in Anchorage, Alaska, on the same day. What was the temperature in Anchorage?

PRACTICE AND PROBLEM SOLVING

Solve each equation. Check your answer.

21. $9y = 900$
22. $d - 15 = 45$
23. $j + 56 = -7$
24. $\frac{s}{-20} = 7$
25. $-85 = -5c$
26. $v - 39 = -16$
27. $11y = -121$
28. $\frac{n}{36} = 9$
29. $w + 41 = 0$
30. $\frac{r}{238} = 8$
31. $-23 = x + 35$
32. $0 = -15m$
33. $4x = 2 + 14$
34. $c + c + c = 6$
35. $t - 3 = 4 + 2$

36. **Geometry** The three angles of a triangle have equal measures. The sum of their measures is 180°. What is the measure of each angle?

37. **Sports** Herb has 42 days to prepare for a cross-country race. During his training, he will run a total of 126 miles. If Herb runs the same distance every day, how many miles will he run each day?

38. **Multi-Step** Jared bought one share of stock for $225.
   a. He sold the stock for a profit of $55. What was the selling price of the stock?
   b. The price of the stock dropped $40 the day after Jared sold it. At what price would Jared have sold it if he had waited until then?

○ = WORKED-OUT SOLUTIONS on p. WS3

Translate each sentence into an equation. Then solve the equation.

39. The sum of -13 and a number p is 8.

40. A number x divided by 4 is -7.

41. 9 less than a number t is -22.

42. Physical Science On the Kelvin temperature scale, pure water boils at 373 K. The difference between the boiling point and the freezing point of water on this scale is 100 K. What is the freezing point of water?

Recreation The graph shows the most popular travel destinations over Labor Day weekend. Use the graph for Exercises 43 and 44.

43. Which destination was 5 times more popular than theme or amusement parks?

44. According to the graph, the mountains were as popular as state or national parks and what other destination combined?

45. Choose a Strategy Matthew (M) earns \$23 less a week than his sister Allie (A). Their combined salaries are \$93. How much does each of them earn per week?

Ⓐ A: \$35; M: \$12 Ⓑ A: \$35; M: \$58 Ⓒ A: \$58; M: \$35

46. Write About It Explain how to isolate a variable in an equation.

47. Challenge Write an equation that includes the variable p and the numbers 5, 3, and 31 so that the solution is $p = 16$.

Florida Spiral Review

MA.7.A.3.3, MA.7.A.3.1

48. Multiple Choice Solve $-15m = 60$.

A. $m = -4$ B. $m = 5$ C. $m = 45$ D. $m = 75$

49. Multiple Choice For which equation does $x = 2$?

F. $-3x = 6$ G. $x + 3 = -5$ H. $x + x = 4$ I. $\frac{x}{4} = -8$

Simplify each expression. Justify each step. (Lesson 1-3)

50. $5 + 6 + 19$ **51.** $5 \cdot 10 \cdot 2$ **52.** $3 \cdot (5 \cdot 9)$

Compare. Write <, >, or =. (Lessons 2-1, 2-2, and 2-3)

53. $|-5| \square -8$ **54.** $4 \square |-4|$ **55.** $|-7| \square |-9|$

56. $-10 \square |-10|$ **57.** $-7 - 8 \square -15$ **58.** $-12 \square 10 + (-12)$

Name _____ Date _____ Class_____

LESSON 2-6

Practice A

Solving Two-Step Equations

Solve each equation. Cross out each number in the box that matches a solution.

6	–8	–2	–6	–18	–3	2	4	8	3	18

1. $5x + 8 = 23$ _____

2. $-2p - 4 = 2$ _____

3. $6a - 11 = 13$ _____

4. $4n + 12 = 4$ _____

5. $9g + 2 = 20$ _____

6. $\frac{k}{6} + 8 = 5$ _____

7. $\frac{s}{3} - 4 = 2$ _____

8. $\frac{c}{2} + 5 = 1$ _____

9. $9 + \frac{a}{6} = 8$ _____

Solve. Check each answer.

10. $3v - 12 = 15$ _____

11. $8 + 5x = -2$ _____

12. $\frac{d}{4} - 9 = -3$ _____

13. An electrician charges $50 to come to your house. He also charges $25 for each hour he spends at your house. The electrician charges you a total of $125. How many hours did he spend at your house?

_____

Name _____ Date _____ Class _____

LESSON 2-6

Reading Strategies

Follow a Procedure

To solve two-step equations, follow these steps.

To Solve Two-Step Equations

$3n + 5 = 23$

Step 1: Get the variable term by itself. Use the inverse operation.	$3n + 5 - \mathbf{5} = 23 - \mathbf{5}$ $3n = 18$	Subtract 5 from both sides.
Step 2: Get the variable by itself. Use the inverse operation.	$\frac{3n}{\mathbf{3}} = \frac{18}{\mathbf{3}}$	Divide both sides by 3.
Step 3: Compute and simplify the solution.	$n = 6$	

Answer the following questions.

1. What is the first step in solving a two-step equation?

   _____

   _____

2. Which term in the equation above does not contain a variable?

   _____

3. What operation was performed to remove that term?

   _____

   _____

4. What is the second step in solving a two-step equation?

   _____

5. Which term in the equation contains a variable?

   _____

6. What operation was performed to get the *n* by itself?

   _____

7. What is the third step in a two-step equation?

   _____

Name _____ Date _____ Class _____

LESSON 2-6

Review for Mastery

Solving Two-Step Equations

You can solve two-step equations by undoing one operation at a time. First undo any addition or subtraction, then undo any multiplication or division.

Complete the steps to solve each equation.

1. $7x + 3 = 31$

$7x + 3 - \_\_\_\_\_ = 31 - \_\_\_\_\_$ ← Subtract _____ from both sides to undo addition.

$7x = 28$

$\frac{7x}{\_\_\_} = \frac{28}{\_\_\_}$ ← Divide both sides by _____ to undo multiplication.

$x = 4$

Check

$7x + 3 = 31$

$7(\_\_\_\_\_) + 3 \stackrel{?}{=} 31$ ← Substitute _____ for x.

$\_\_\_\_\_ + 3 \stackrel{?}{=} 31$

$31 \stackrel{?}{=} 31$ ✓ ← 4 is a solution.

2. $\frac{n}{6} - 8 = 4$

$\frac{n}{6} - 8 + \_\_\_ = 4 + \_\_\_$

$\frac{n}{6} = 12$

$6 \cdot \frac{n}{6} = \_\_\_ \cdot 12$

$n = \_\_\_$

3. $8a - 5 = 11$

$8a - 5 + \_\_\_ = 11 + \_\_\_$

$8a = \_\_\_$

$\frac{8a}{8} = \frac{16}{8}$

$a = \_\_\_$

4. $9 + \frac{w}{2} = 12$

$9 - \_\_\_ + \frac{w}{2} = 12 - \_\_\_$

$\frac{w}{2} = \_\_\_$

$2 \cdot \frac{w}{2} = \_\_\_ \cdot 3$

$w = \_\_\_$

Solve.

5. $4n + 11 = 27$

6. $\frac{z}{7} - 6 = 3$

7. $3 - 2k = -7$

_____ _____ _____

Name _____ Date _____ Class _____

LESSON 2-6

Student Worksheet

Solving Two-Step Equations

Problem 1

Solve. $19 = -3p - 8$

$19 = -3p - 8$
$+8 \quad +8$

−8 and +8 are inverses.

$27 = -3p$

p is not alone.

$\frac{27}{-3} = \frac{-3p}{-3}$

Divide by −3.

LOOK!

$-9 = p$

Now *p* is alone.

Problem 2

Find the monthly cost for the membership.

Let monthly cost = *m.*

28 + **12***m* = **160**

- **28**: the one-time payment
- **12***m*: the number of payments each year
- **160**: the total amount paid

Think and Discuss

1. In Problem 1, why can you *not* leave $27 = -3p$ as your answer?

_____

2. In Problem 2, why do you multiply the variable by 12?

_____

3. In Problem 2, if you want to find the amount members pay per day, how would you change the equation?

_____

Name _____ Date _____ Class _____

LESSON 3-6

Practice A

Solving Equations Containing Decimals

Solve. Choose the letter for the best answer.

1. $t + 0.7 = 9$

   A $t = 9.7$ C $t = 6.3$

   B $t = 8.3$ D $t = 0.63$

2. $p - 1.6 = 11$

   F $p = 6.875$ H $p = 12.6$

   G $p = 9.4$ I $p = 17.6$

3. $\frac{h}{3} = 1.5$

   A $h = 0.5$ C $h = 9$

   B $h = 4.5$ D $h = 45$

4. $7z = 2.1$

   F $z = -4.9$ H $z = 14.7$

   G $z = 0.3$ I $z = 2.8$

Solve.

5. $x - 5.1 = 4.8$ _____

6. $h + 6.9 = 12.7$ _____

7. $k + 9.2 = -7.6$ _____

8. $g - 4.44 = 2.4$ _____

9. $0.18 + w = 0.75$ _____

10. $m - 3.1 = 9.65$ _____

11. $4.2n = 14.7$ _____

12. $9.7j = 58.2$ _____

13. $56p = -11.76$ _____

14. $43.2 = 2.7y$ _____

15. $64.6 = 6.8x$ _____

16. $40.32 = 12.6m$ _____

17. $\frac{s}{5.4} = 6$ _____

18. $\frac{f}{0.8} = 7$ _____

19. $\frac{d}{4.6} = 0.7$ _____

20. $\frac{c}{0.4} = 1.75$ _____

21. $\frac{h}{6.1} = 12$ _____

22. $\frac{a}{0.35} = 8.4$ _____

23. A group of 15 people went to the movies. The total cost for tickets and snacks was $158.75. If the snacks cost $65.00, how much did each of the 15 tickets cost? _____

24. A couple is going to a concert. They pay $10 for parking. The total cost for parking and 2 tickets is $35. How much does one ticket cost? _____

Name _____ Date _____ Class_____

LESSON 3-6

Reading Strategies

Compare and Contrast

Compare the steps for solving equations with whole numbers to the steps for solving equations with decimals.

Solving Equations with Whole Numbers	**Example:**
Step 1: This is a subtraction problem. Add to get x by itself.	$x - 145 = 1{,}720$
Step 2: Add **145** to both sides of the equation.	$x - 145 + \mathbf{145} = 1{,}720 + \mathbf{145}$
Step 3: Solve	$x = 1{,}865$

Solving Equations with Decimals	**Example:**
Step 1: This is a subtraction problem. Add to get x by itself.	$x - 1.45 = 17.2$
Step 2: Add **1.45** to both sides of the equation.	$x - 1.45 + \mathbf{1.45} = 17.2 + \mathbf{1.45}$
Step 3: Solve.	$x = 18.65$

Use the chart to answer the following questions.

1. Compare the steps in solving an equation with whole numbers to the steps for an equation with decimals. What do you notice?

   _____

2. What is different about solving an equation with whole numbers and solving an equation with decimals?

   _____

   _____

Compare solving a multiplication equation with whole numbers to one with decimals: $3y = 702$; $3y = 7.02$. Answer each question.

3. What is the first step in solving both equations?

   _____

4. What operation will you use first in the two equations?

   _____

5. Compare the number you divide by on both sides of the whole number equation to the number you divide by in the decimal equation.

   _____

Name _____ Date _____ Class _____

LESSON 3-6

Review for Mastery

Solving Equations Containing Decimals

You can solve equations with decimals the same way you solve equations with whole numbers. Remember to always perform the same calculation on both sides of the equation to keep the two sides equal.

- You can use addition to solve a subtraction equation involving decimals.

$x - 1.45 = 6.7$

$x - 1.45 + \mathbf{1.45} = 6.7 + \mathbf{1.45}$

$x = 8.15$

Addition undoes subtraction.

- You can use subtraction to solve an addition equation involving decimals.

$n + 24.8 = -15.2$

$n + 24.8 - \mathbf{24.8} = -15.2 - \mathbf{24.8}$

$n = -40$

Subtraction undoes addition.

Solve.

1. $e + 7.1 = 9.3$

$e + 7.1 - 7.1 = 9.3 - 7.1$

$e =$ _____

2. $x - 1.9 = 5.4$

$x - 1.9 +$ _____ $= 5.4 +$ _____

$x =$ _____

3. $w - 8.3 = -4.12$

$w - 8.3$ _____ $= -4.12$ _____

$w =$ _____

4. $b + 5.75 = -6.2$

$b + 5.75$ _____ $= -6.2$ _____

$b =$ _____

5. $t + 39.5 = 54.1$

_____

6. $p - 29.4 = 3.7$

_____

7. $r - 6.25 = -17.3$

_____

8. $k + 9.8 = -11.9$

_____

Name _____ Date _____ Class _____

LESSON 3-6

Review for Mastery

Solving Equations Containing Decimals (continued)

- You can use division to solve a multiplication equation involving decimals.

$$3.6y = 9$$
$$\frac{3.6y}{3.6} = \frac{9}{3.6}$$
$$y = 2.5$$

Division undoes multiplication.

- You can use multiplication to solve a division equation involving decimals.

$$\frac{a}{4.2} = 18$$
$$\mathbf{4.2} \cdot \frac{a}{4.2} = 18 \cdot \mathbf{4.2}$$
$$a = 75.6$$

Multiplication undoes division.

Solve.

9. $5.7g = 45.6$

$5.7g \div$ _____ $= 45.6 \div$ _____

$g =$ _____

10. $-6f = 8.04$

$-6f$ _____ _____ $= 8.04$ _____ _____

$f =$ _____

11. $\frac{n}{0.14} = 15$

_____ $\cdot \frac{n}{0.14} = 15 \cdot$ _____

$n =$ _____

12. $\frac{m}{6.3} = -9.1$

_____ _____ $\frac{m}{6.3} = -9.1$ _____ _____

$m =$ _____

13. $8y = 93.6$

_____

14. $-3.4c = 20.74$

_____

15. $\frac{s}{10.5} = 3.8$

_____

16. $\frac{h}{0.4} = -7.2$

_____

Name _____ Date _____ Class _____

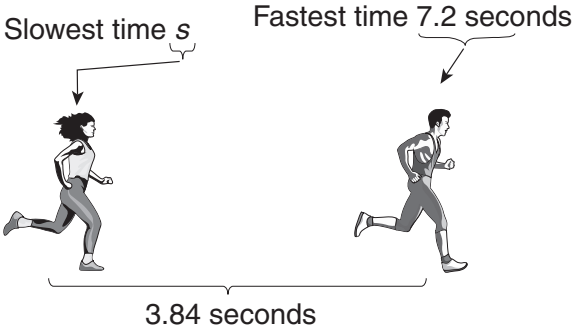
LESSON 3-6

Student Worksheet

Solving Equations Containing Decimals

Problem 1

What is the slowest time s?



The difference between the fastest and slowest time is 3.84 seconds.

The slowest time is s.

The fastest time is 7.2 seconds.

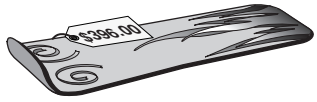
$$s - 3.84 = 7.2$$
$$+3.84 \quad +3.84$$
$$s = 11.04$$

Problem 2

How many hours does Yancey need to work to buy the snowboard?

= 1 hour → \$8.25

Work 1 hour and receive 8.25.



8.25 • (number of hours) = 396

$8.25 \cdot h = 396$ Divide 396 by 8.25.

$$\frac{8.25h}{8.25} = \frac{396}{8.25}$$
$$h = 48$$

Yancey needs to work 48 hours.

Think and Discuss

1. Explain why you can add, subtract, multiply, or divide by decimals on both sides of an equation.

2. What property did you use in Problem 1 to solve for s?

3. What compatiable numbers can you use in Problem 2 to estimate the number of hours that Yancey needs to work?

3-6 Exercises

Homework Help THINK central
Go to thinkcentral.com
Exercises 1–22, 25, 29, 31, 35, 37, 39, 41

MA.7.A.3.3

GUIDED PRACTICE

See Example 1 **Solve. Justify your steps.**

1. $w - 5.8 = 1.2$
2. $x + 9.15 = 17$
3. $k + 3.91 = 28$
4. $n - 1.35 = 19.9$

See Example 2

5. $\frac{b}{1.4} = 3.6$
6. $\frac{x}{0.8} = 7.2$
7. $3.1t = 27.9$
8. $7.5 = 5y$

See Example 3

9. **Consumer Math** Jeff bought a sandwich for $6.45 and some pasta salad for $2.40 per pound. His total bill was $10.29, not including tax. How much pasta salad did Jeff buy?

INDEPENDENT PRACTICE

See Example 1 **Solve. Justify your steps.**

10. $v + 0.84 = 6$
11. $c - 32.56 = 12$
12. $d - 14.25 = -23.9$
13. $3.52 + a = 8.6$
14. $w - 9.01 = 12.6$
15. $p + 30.34 = -22.87$

See Example 2

16. $3.2c = 8$
17. $72 = 4.5z$
18. $21.8x = -124.26$
19. $\frac{w}{2.8} = 4.2$
20. $\frac{m}{0.19} = 12$
21. $\frac{a}{21.23} = -3.5$

See Example 3

22. At the fair, the cost for admission is $15.25 and each ride costs $1.50. If Juan's total cost was $28.75, how many rides did he ride?

PRACTICE AND PROBLEM SOLVING

Solve. Justify your steps.

23. $r + 0.48 = 1.2$
24. $x - 5.2 = -7.3$
25. $1.05 = -7m$
26. $a + 0.81 = -6.3$
27. $6.4k + 2.6 = 5.4$
28. $\frac{h}{-7.1} = 0.62$
29. $\frac{t}{-0.18} = -5.2$
30. $7.9 = d + 12.7$
31. $-1.8 + v = -3.8$
32. $-k + 19.7 = 27.608$
33. $-8.3n + 37.15 = 12.25$
34. $0.64f - 21.2 = 12.8$
35. $15.217 - j = 4.11$
36. $-2.1 = p + (-9.3)$
37. $\frac{27.3}{g} = 54.6$

38. The Drama Club is selling cookie dough to raise money. The club already raised $118.75 from a previous fundraiser. If each tub of cookie dough costs $4.75, how many tubs must members sell to raise a total of $570.00?

39. **Consumer Math** Gregory bought a computer desk at a thrift store for $38. The regular price of a similar desk at a furniture store is 4.5 times as much. What is the regular price of the desk at the furniture store?

○ = WORKED-OUT SOLUTIONS on p. WS5

LINK
Social Studies

From 1892 to 1924, more than 22 million immigrants came to Ellis Island, New York.

40. Physical Science Pennies minted, or created, before 1982 are made mostly of copper and have a density of 8.85 g/cm³. Because of an increase in the cost of copper, the density of pennies made after 1982 is 1.71 g/cm³ less. What is the density of pennies minted today?

41. Social Studies The table shows the most common European ancestral origins of Americans (in millions), according to a Census 2000 supplementary survey. In addition, 19.6 million people stated that their ancestry was "American."

Ancestral Origins of Americans	
European Ancestry	Number (millions)
English	28.3
French	9.8
German	46.5
Irish	33.1
Italian	15.9
Polish	9.1
Scottish	5.4

a. How many people claimed ancestry from the countries listed, according to the survey?

b. If the data were placed in order from greatest to least, between which two nationalities would "American" ancestry be placed?

42. What's the Error? A student's solution to the equation $2m + 0.63 = 5$ was $m = 4.37$. What is the error? What is the correct solution?

43. Write About It Compare the process of solving equations containing integers with the process of solving equations containing decimals.

44. Challenge Solve the equation $-2.8 + (b - 1.7) = -0.6 \cdot 9.4$.

Florida Spiral Review

MA.7.A.3.3, MA.7.A.3.2

45. Multiple Choice What is the solution of the equation $-4.55 + x = 6.32$?

A. $x = -1.39$ **B.** $x = 1.77$ **C.** $x = 10.87$ **D.** $x = 28.76$

46. Multiple Choice The pep squad is selling tickets for a raffle. The tickets are \$0.25 each or 5 for \$1.00. Julie bought a pack of 5 tickets. Which equation can be used to find how much Julie paid per ticket?

F. $5x = 0.25$ **G.** $0.25x = 1.00$ **H.** $5x = 1.00$ **I.** $1.00x = 0.25$

47. Extended Response Write a word problem that the equation $6.25x = 125$ can be used to solve. Solve the problem and explain what the solution means.

Simplify. Estimate to check whether each answer is reasonable. (Lesson 3-4)

48. $(1.18)^2$ **49.** $(3.5)^2$ **50.** $(5.7)^3$ **51.** $(1.1)^3$

Simplify each expression. (Lesson 3-5)

52. $6.3 \div 2.1 - 1.5$ **53.** $4 \cdot 5.1 \div 2 + 3.6$ **54.** $(1.6 + 3.8) \div 1.8$

55. $(-5.4 + 3.6) \div 0.9$ **56.** $-4.5 \div 0.6 \cdot (-1.2)$ **57.** $5.8 + 3.2 \div (-6.4)$

Name _____ Date _____ Class _____

LESSON 3-12

Practice A

Solving Equations Containing Fractions

Solve. Choose the letter for the best answer.

1. $t - \frac{3}{4} = \frac{1}{4}$

   A $t = \frac{1}{4}$ C $t = \frac{3}{4}$

   B $t = \frac{1}{2}$ D $t = 1$

2. $g - \frac{3}{8} = \frac{1}{8}$

   F $g = \frac{1}{4}$ H $g = \frac{3}{4}$

   G $g = \frac{1}{2}$ I $g = 1$

3. $k + \frac{7}{12} = \frac{11}{12}$

   A $k = \frac{1}{4}$ C $k = \frac{1}{2}$

   B $k = \frac{1}{3}$ D $k = 1$

4. $n + \frac{2}{5} = \frac{4}{5}$

   F $n = \frac{2}{5}$ H $n = \frac{4}{5}$

   G $n = \frac{3}{5}$ I $n = 1$

5. $f + \frac{1}{6} = \frac{5}{6}$

   A $f = \frac{1}{6}$ C $f = \frac{1}{2}$

   B $f = \frac{1}{3}$ D $f = \frac{2}{3}$

6. $\frac{1}{4}s = 4$

   F $s = \frac{1}{2}$ H $s = 4$

   G $s = 1$ I $s = 16$

Solve. Write each answer in simplest form.

7. $p - \frac{1}{4} = \frac{1}{6}$ _____

8. $d - \frac{2}{5} = \frac{3}{10}$ _____

9. $y + \frac{5}{8} = \frac{3}{4}$ _____

10. $\frac{3}{4}m = \frac{5}{6}$ _____

11. $\frac{1}{2}x = \frac{5}{8}$ _____

12. $\frac{5}{6}r = \frac{3}{10}$ _____

13. Eunice paid $10.25 for a pizza and two sodas. The pizza cost $7.75. If the two sodas each cost the same amount, what is the price of one soda?

_____

Name _____ Date _____ Class _____

LESSON 3-12

Reading Strategies

Compare and Contrast

Compare the steps for solving equations with fractions and solving equations with whole numbers.

Steps for Solving Equations		
	Whole Numbers	**Fractions**
Step 1: Get x by itself on one side of the equation.	$x - 8 = 7$	$x - \frac{3}{12} = \frac{4}{12}$
Step 2: Perform the opposite operation. In a subtraction problem, you add to get x by itself.	$x - 8 + \mathbf{8} = 7 + \mathbf{8}$	$x - \frac{3}{12} + \frac{\mathbf{3}}{\mathbf{12}} = \frac{4}{12} + \frac{\mathbf{3}}{\mathbf{12}}$
Step 3: Solve.	$x = 15$	$x = \frac{7}{12}$

Use the chart to answer each question.

1. What is the first step to solve an equation with whole numbers?

   _____

2. Compare the first step in solving an equation with whole numbers to fractions. Is it the same or different?

   _____

3. What is the second step in solving an equation with whole numbers?

   _____

4. Compare the second step in solving an equation with whole numbers to an equation with fractions. Is it the same or different?

   _____

5. What is the opposite operation in both of the examples in the chart?

   _____

6. What is the third step in solving an equation with whole numbers?

   _____

7. Compare the third step in solving an equation with whole numbers to solving an equation with fractions. Is it the same or different?

   _____

Name _____ Date _____ Class _____

LESSON 3-12

Review for Mastery

Solving Equations Containing Fractions

You can use addition to solve a subtraction equation involving fractions.

$$x - \frac{4}{9} = \frac{1}{3}$$

$$x - \frac{4}{9} + \mathbf{\frac{4}{9}} = \frac{1}{3} + \mathbf{\frac{4}{9}}$$

$$x = \frac{3}{9} + \frac{4}{9}$$

$$x = \frac{7}{9}$$

Remember, addition undoes subtraction.

You can use subtraction to solve an addition equation involving fractions.

$$n + \frac{2}{5} = \frac{9}{10}$$

$$n + \frac{2}{5} - \mathbf{\frac{2}{5}} = \frac{9}{10} - \mathbf{\frac{2}{5}}$$

$$n = \frac{9}{10} - \frac{4}{10}$$

$$n = \frac{5}{10} = \frac{1}{2}$$

Remember, subtraction undoes addition.

Solve. Write each answer in simplest form.

1. $d - \frac{1}{6} = \frac{3}{4}$

$d - \frac{1}{6} + \text{—} = \frac{3}{4} + \text{—}$

$d = \frac{\quad}{12} + \frac{\quad}{12}$

$d = \frac{\quad}{12}$

2. $y + \frac{4}{5} = \frac{14}{15}$

$y + \frac{4}{5} - \text{—} = \frac{14}{15} - \text{—}$

$y = \frac{14}{15} - \frac{\quad}{15}$

$y = \frac{\quad}{15}$

3. $t - \frac{1}{8} = \frac{3}{4}$

_____

4. $k + \frac{1}{2} = 1\frac{5}{8}$

_____

5. $a - \frac{3}{5} = \frac{7}{10}$

_____

Name _____ Date _____ Class _____

LESSON 3-12

Review for Mastery

Solving Equations Containing Fractions (continued)

You can use division to solve a multiplication equation involving fractions. Multiply both sides of the equation by the reciprocal of the coefficient of the variable.

$$3y = \frac{9}{10}$$

$$3y \cdot \frac{\mathbf{1}}{\mathbf{3}} = \frac{9}{10} \cdot \frac{\mathbf{1}}{\mathbf{3}}$$

The reciprocal of 3 is $\frac{1}{3}$.

$$y = \frac{9}{10} \cdot \frac{1}{3}$$

$$y = \frac{9}{30} = \frac{3}{10}$$

$$\frac{5}{6}a = \frac{1}{2}$$

$$\frac{5}{6}a \cdot \frac{\mathbf{6}}{\mathbf{5}} = \frac{1}{2} \cdot \frac{\mathbf{6}}{\mathbf{5}}$$

The reciprocal of $\frac{5}{6}$ is $\frac{6}{5}$.

$$a = \frac{1}{2} \cdot \frac{6}{5}$$

$$a = \frac{6}{10} = \frac{3}{5}$$

Solve. Write each answer in simplest form.

6. $8x = 3\frac{1}{5}$

$8x = \frac{\quad}{5}$

$8x \cdot \frac{\quad}{\quad} = \frac{\quad}{5} \cdot \frac{\quad}{\quad}$

$x = \frac{\quad}{5} \cdot \frac{\quad}{\quad}$

$x = \frac{\quad}{\quad} = \frac{\quad}{\quad}$

7. $\frac{2}{3}k = \frac{5}{6}$

$\frac{2}{3}k \cdot \frac{\quad}{\quad} = \frac{5}{6} \cdot \frac{\quad}{\quad}$

$k = \frac{5}{6} \cdot \frac{\quad}{\quad}$

$k = \frac{\quad}{\quad} = \frac{\quad}{\quad} = \frac{\quad}{\quad}$

8. $\frac{3}{4}d = 5$

9. $6y = \frac{2}{3}$

10. $\frac{1}{5}s = \frac{5}{8}$

_____ _____ _____

Name _____ Date _____ Class _____

LESSON 3-12

Student Worksheet

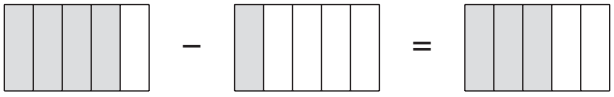
Solving Equations Containing Fractions

Problem 1

Solve. $x - \frac{1}{5} = \frac{3}{5}$

$x - \frac{1}{5} + \frac{1}{5} = \frac{3}{5} + \frac{1}{5}$ Add $\frac{1}{5}$ to both sides.

$x = \frac{4}{5}$



$\frac{4}{5} - \frac{1}{5} = \frac{3}{5}$

Problem 2

$\frac{1}{4}$ = lbs of cheese
***x* = lbs of ham**
***x* = lbs of roast pork**
***x* = lbs of turkey**
$5\frac{1}{2}$ = total lbs

So

$$\frac{1}{4} + x + x + x = 5\frac{1}{2}$$

$$\frac{1}{4} + 3x = 5\frac{1}{2}$$

$$\frac{1}{4} - \frac{1}{4} + 3x = 5\frac{1}{2} - \frac{1}{4}$$

$$3x = 5\frac{1}{4}$$

$$3x \cdot \frac{1}{3} = 5\frac{1}{4} \cdot \frac{1}{3}$$

$$x = \frac{21}{4} \cdot \frac{1}{3}$$

$$x = \frac{7}{4}, \text{ or } 1\frac{3}{4}$$

There are $1\frac{3}{4}$ lbs each of ham, roast pork, and turkey.

Think and Discuss

1. When solving an equation containing fractions as in Problem 1, how do you undo *adding* a fraction?

_____

2. What is the goal when solving equations with fractions?

_____

3. Complete the sentence. Always make sure that if your solution is a fraction that it is _____.

3-12 Exercises

Homework Help — THINK central
Go to thinkcentral.com
Exercises 1–20, 27, 31, 33, 35, 39, 41, 43

MA.7.A.3.3

GUIDED PRACTICE

See Example 1 **Solve. Write each answer in simplest form.**

1. $a - \frac{1}{2} = \frac{1}{4}$
2. $m + \frac{1}{6} = \frac{5}{6}$
3. $p - \frac{2}{3} = \frac{5}{6}$

See Example 2

4. $\frac{1}{5}x = 8$
5. $\frac{2}{3}r = \frac{3}{5}$
6. $3w = \frac{3}{7}$

See Example 3

7. A 10 lb gift basket contains $6\frac{1}{4}$ lb of fruit and equal amounts of dark and milk chocolate. How much of each kind of chocolate is in the basket?

INDEPENDENT PRACTICE

See Example 1 **Solve. Write each answer in simplest form.**

8. $n - \frac{1}{5} = \frac{3}{5}$
9. $t - \frac{3}{8} = \frac{1}{4}$
10. $s - \frac{7}{24} = \frac{1}{3}$
11. $x + \frac{2}{3} = 2\frac{7}{8}$
12. $h + \frac{7}{10} = \frac{7}{10}$
13. $y + \frac{5}{6} = \frac{19}{20}$

See Example 2

14. $\frac{1}{5}x = 4$
15. $\frac{1}{4}w = \frac{1}{8}$
16. $5y = \frac{3}{10}$
17. $6z = \frac{1}{2}$
18. $\frac{5}{8}x = \frac{2}{5}$
19. $\frac{5}{8}n = 1\frac{1}{5}$

See Example 3

20. As an appetizer for a dinner party, Miguel prepares an olive tray. There are $2\frac{3}{8}$ lb of black olives and equal amounts of green and stuffed olives. If the total weight of the olives is $8\frac{1}{2}$ lb, how many pounds each of green and stuffed olives is there?

PRACTICE AND PROBLEM SOLVING

Solve. Write each answer in simplest form.

21. $\frac{4}{5}t = \frac{1}{5}$
22. $m - \frac{1}{2} = \frac{2}{3}$
23. $\frac{1}{8}w = \frac{3}{4}$
24. $\frac{8}{9} + t = \frac{17}{18}$
25. $\frac{5}{3}x = 1$
26. $j + \frac{5}{8} = \frac{11}{16}$
27. $\frac{4}{3}n = 3\frac{1}{5}$
28. $z + \frac{1}{6} = 3\frac{9}{15}$
29. $\frac{3}{4}y = \frac{3}{8}$
30. $-\frac{5}{26} + m = -\frac{7}{13}$
31. $-\frac{8}{77} + r = -\frac{1}{11}$
32. $y - \frac{3}{4} = -\frac{9}{20}$
33. $h - \frac{3}{8} = -\frac{11}{24}$
34. $-\frac{5}{36}t = -\frac{5}{16}$
35. $-\frac{8}{13}v = -\frac{6}{13}$
36. $4\frac{6}{7} + p = 5\frac{1}{4}$
37. $d - 5\frac{1}{8} = 9\frac{3}{10}$
38. $6\frac{8}{21}k = 13\frac{1}{3}$

39. Wendy is 5 years older than $2\frac{1}{2}$ times Luke's age. If Wendy is $20\frac{3}{4}$ years old, how old is Luke?

40. **Weather** Yuma, Arizona, receives $102\frac{1}{100}$ fewer inches of rain each year than Quillayute, Washington, which receives $105\frac{9}{50}$ inches per year. (*Source:* National Weather Service). How much rain does Yuma get in one year?

○ = WORKED-OUT SOLUTIONS on p. WS5

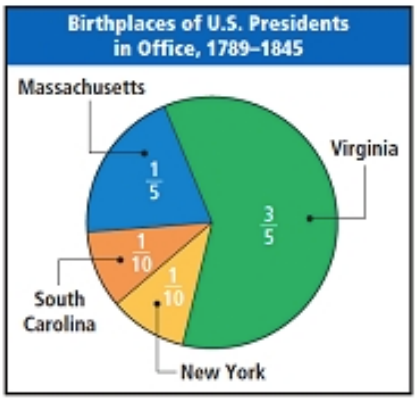
41. **Life Science** Scientists have discovered $1\frac{1}{2}$ million species of animals. This is estimated to be $\frac{1}{10}$ the total number of species thought to exist. About how many species do scientists think exist?

LINK

Architecture

The Chase Tower is the tallest skyscraper in Indiana. The two spires bring the building's height to 830 feet. One of the spires functions as a communications antenna, while the other is simply decorative.

42. **History** The circle graph shows the birthplaces of the United States' presidents who were in office between 1789 and 1845.



   a. If six of the presidents represented in the graph were born in Virginia, how many presidents are represented in the graph?

   b. Based on your answer to **a**, how many of the presidents were born in Massachusetts?

43. **Architecture** In Indianapolis, the Market Tower has $\frac{2}{3}$ as many stories as the Chase Tower. If the Market Tower has 32 stories, how many stories does the Chase Tower have?

44. **Multi-Step** Each week, Jennifer saves $\frac{1}{5}$ of her allowance and spends some of the rest on lunches. This week, she had $\frac{2}{15}$ of her allowance left after buying her lunch each day. What fraction of her allowance did she spend on lunches?

45. **What's the Error?** A student solved $\frac{3}{5}x = \frac{2}{3}$ and got $x = \frac{2}{5}$. Find the error.

46. **Write About It** Solve $3\frac{1}{3}z = 1\frac{1}{2}$. Explain why you need to write mixed numbers as improper fractions when multiplying and dividing.

47. **Challenge** Solve $\frac{3}{5}w = 0.9$. Write your answer as a fraction and as a decimal.

Florida Spiral Review

MA.7.A.3.2, MA.7.A.3.3, MA.7.A.5.1

48. **Multiple Choice** Which value of y is the solution to the equation $y - \frac{7}{8} = \frac{3}{5}$?

   A. $y = -\frac{11}{40}$ B. $y = \frac{10}{13}$ C. $y = 1\frac{19}{40}$ D. $y = 2$

49. **Multiple Choice** Which equation has the solution $x = -\frac{2}{5}$?

   F. $\frac{2}{5}x = -1$ G. $-\frac{3}{4}x = \frac{6}{20}$ H. $-\frac{4}{7} + x = \frac{2}{3}$ I. $x - 3\frac{5}{7} = 3\frac{1}{2}$

Evaluate each expression for $x = -5$, $y = 2$, for $z = -4$. (Lesson 2-3)

50. $x - y - z$ 51. $-\left(\frac{y}{z}\right)^2$ 52. $y - xz$ 53. $\frac{z}{y} - x$

Give two numbers equivalent to each fraction or decimal. (Lesson 2-11)

54. $12\frac{4}{5}$ 55. $7\frac{3}{5}$ 56. 3.04 57. 0.45