

Hesby Oaks Leadership Charter

Summer Math Packet Ms. Walsh Grade 8

- Read and study the examples
- Complete the Guided Practice
- Complete the independent practice
- Show your work
- Due at the end of the first week of school in the fall

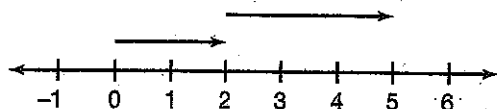


SKILL 4: Addition of Integers

You can think of adding integers as making moves on a number line.

Example 1

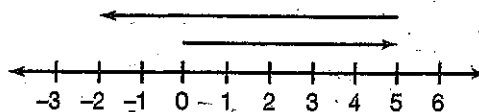
a. Use the number line to find $2 + 3$.



Start at 0. Move 2 units to the right.
Then move 3 more units to the right.

So, $2 + 3 = 5$.

b. Use the number line to find $5 + (-7)$.



Start at 0. Move 5 units to the right.
Then move 7 units to the left.

So, $5 + (-7) = -2$.

You can also add integers without the number line.

To add two integers with the same sign: Add the absolute values of the numbers. The sum has the same sign as the addends.

To add integers with different signs: Find their absolute values. The sum is in the direction of the number with the larger absolute value. Subtract the smaller absolute value from the larger to find out how far the sum is in that direction.

Example 2

a. Find $-4 + (-6)$.

$$|-4| = 4, \text{ and } |-6| = 6.$$

Both numbers are negative.

Add the absolute values, 4 and 6,
to get 10. Use the negative sign.

So, $-4 + (-6) = -10$.

b. Find $7 + (-9)$.

$$|-7| = 7, \text{ and } |-9| = 9.$$

The numbers have different signs.

Subtract the smaller absolute value, 7,
from 9 to obtain 2. The number -9

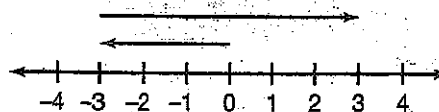
has a larger absolute value than the
number 7, so the answer is negative.

So, $7 + (-9) = -2$.

Guided Practice

1. Use the number line to find $-3 + 6$.

Start at 0. Move _____ units to the left. Then
move _____ units to the right. So, $-3 + 6 =$ _____.

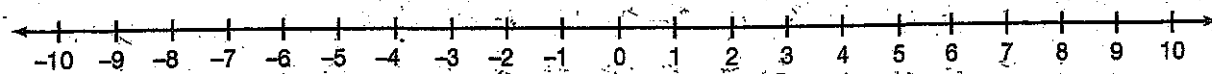


2. Find $-4 + 7$.

The numbers have different signs. Subtract the smaller absolute value
from the larger to get _____. Since 7 has a larger absolute value than -4 ,
the sign of the answer is _____. So, $-4 + 7 =$ _____.

SKILL 4: Practice

Use the number line to find each sum.



1. $-2 + 7 =$ _____
2. $3 + (-5) =$ _____
3. $5 + 3 =$ _____
4. $7 + (-8) =$ _____
5. $8 + (-8) =$ _____
6. $-3 + (-2) =$ _____
7. $-4 + 9 =$ _____
8. $2 + (-9) =$ _____
9. $3 + (-1) =$ _____
10. $-6 + (-2) =$ _____
11. $4 + 5 =$ _____
12. $-8 + 5 =$ _____
13. $7 + 3 =$ _____
14. $-3 + 2 =$ _____
15. $5 + (-4) =$ _____

Add the integers.

16. $-7 + 12 =$ _____
17. $35 + (-1) =$ _____
18. $-10 + (-12) =$ _____
19. $-6 + (-5) =$ _____
20. $0 + (-6) =$ _____
21. $50 + (-2) =$ _____
22. $1 + (-7) =$ _____
23. $15 + (-15) =$ _____
24. $2 + (-9) =$ _____
25. $-31 + 3 =$ _____
26. $4 + (-12) =$ _____
27. $-23 + 8 =$ _____
28. $10 + (-15) =$ _____
29. $42 + 16 =$ _____
30. $-1 + (-4) =$ _____

Solve.

31. The temperature in Middlefield at 6 A.M. was -15°F . By 3 P.M., the temperature had risen 19°F . What was the temperature at 3 P.M.?

32. A diver was 7 m below the surface of the water. The diver then descended 3 m. What integer represents the diver's position after the descent?



33. Find $-12 + 8$.

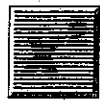
A -20 C 4
B -4 D 20

Skill 4

34. Which number is less than -12 ?

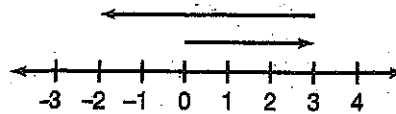
F -14 H -3
G -11 J 4

Skill 3



SKILL 5: Subtraction of Integers

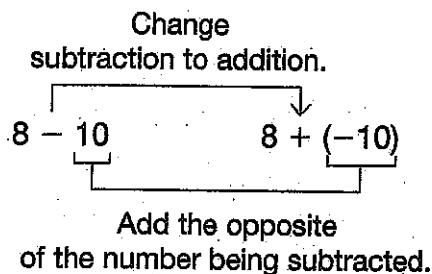
The number line at the right shows how you can find the answer for the subtraction problem $3 - 5$. Start at 0 and go 3 units to the right. From 3, go 5 units to the left. You stop at -2 . So, $3 - 5 = -2$.



Notice that the addition problem $3 + (-5)$ also has the answer -2 . The second number in the addition problem is the opposite of the number that was subtracted in the subtraction problem.

You can use this idea to subtract any two integers.

To subtract two integers: Add the opposite of the number being subtracted.



The answer for $8 - 10$ is the same as the answer for $8 + (-10)$. So, $8 - 10 = -2$.

Example

Find $-10 - 7$.

Change $-10 - 7$ to the addition problem $-10 + (-7)$.

Both the numbers in the addition problem are negative.

Add the absolute values to obtain 17, and use the negative sign.

So, $-10 - 7 = -17$.

Guided Practice

Write an addition for each subtraction. Then show the subtraction result.

1. $9 - 12$

Addition: $9 + (-12) = \underline{\hspace{2cm}}$

So, $9 - 12 = \underline{\hspace{2cm}}$.

2. $-5 - (-9)$

Addition: $-5 + 9 = \underline{\hspace{2cm}}$

So, $-5 - (-9) = \underline{\hspace{2cm}}$.

3. $6 - (-7)$

Addition: $6 + \underline{\hspace{1cm}} = \underline{\hspace{2cm}}$

So, $6 - (-7) = \underline{\hspace{2cm}}$.

4. $2 - 11$

Addition: $2 + (\underline{\hspace{1cm}}) = \underline{\hspace{2cm}}$

So, $2 - 11 = \underline{\hspace{2cm}}$.

SKILL 5: Practice

Write an addition for each subtraction. Then show the subtraction result.

1. $10 - 14$

Addition: _____

So, $10 - 14 =$ _____.

2. $-3 - 11$

Addition: _____

So, $-3 - 11 =$ _____.

3. $-8 - (-6)$

Addition: _____

So, $-8 - (-6) =$ _____.

4. $50 - (-9)$

Addition: _____

So, $50 - (-9) =$ _____.

5. $-15 - 8$

Addition: _____

So, $-15 - 8 =$ _____.

6. $20 - 55$

Addition: _____

So, $20 - 55 =$ _____.

Subtract.

7. $-1 - (-15)$ _____

8. $20 - 3$ _____

9. $11 - (-5)$ _____

10. $20 - 2$ _____

11. $-12 - (-12)$ _____

12. $-2 - (-4)$ _____

13. $7 - 13$ _____

14. $3 - 5$ _____

15. $-6 - 11$ _____

16. $9 - 16$ _____

17. $0 - (-7)$ _____

18. $-4 - (-1)$ _____

19. $5 - (-3)$ _____

20. $-9 - 25$ _____

21. $-18 - 10$ _____

22. $-11 - (-8)$ _____

23. $-16 - 9$ _____

24. $10 - (-9)$ _____

25. $-25 - (-40)$ _____

26. $-48 - 0$ _____

27. $-8 - 7$ _____

Solve.

28. The elevation of New Orleans, Louisiana, is 8 feet below sea level. The elevation of Lake Champlain, Vermont, is 95 feet above sea level. How much higher is the elevation of Lake Champlain than New Orleans?

29. In Fairbanks, Alaska, a typical January temperature is -13°F and a typical April temperature is 30°F . What is the difference between these temperatures?

TEST PREP30. Find $2 - 9$.

A 11

B 7

C -7

D -11

Skill 5

31. Find $-2 + 8$.

F 10

G 6

H -6

J -10

Skill 4



SKILL 6: Multiplication of Integers

Study the patterns below for multiplying integers.

(Note that the raised dot can be used instead of \times to show multiplication.)

$$3 \cdot 2 = 6$$

$$3 \cdot 1 = 3$$

$$3 \cdot 0 = 0$$

$$3 \cdot (-1) = -3$$

$$3 \cdot (-2) = -6$$

$$-4 \cdot 2 = -8$$

$$-4 \cdot 1 = -4$$

$$-4 \cdot 0 = 0$$

$$-4 \cdot (-1) = 4$$

$$-4 \cdot (-2) = 8$$

Note that a positive integer multiplied by a positive integer is positive; a positive integer multiplied by a negative integer is negative.

Note that a negative integer multiplied by a positive integer is negative; a negative integer multiplied by a negative integer is positive.

The product of two numbers with the same sign is positive.

The product of two numbers with different signs is negative.

The product of 0 and any number is 0.

Example

Multiply.

a. $-3 \cdot (-6) = 18$

Both integers are negative, so the product is positive.

b. $-5 \cdot 7 = -35$

The integers have different signs, so the product is negative.

c. $8 \cdot (-4) = -32$

The integers have different signs, so the product is negative.

d. $0 \cdot (-9) = 0$

One of the integers is 0, so the product is zero.

Guided Practice

Tell whether the product is positive, negative, or 0. Then multiply.

1. $2 \cdot (7)$

The integers have the same sign.

The product is _____.

So, $2 \cdot (7) = \underline{\hspace{2cm}}$.

2. $5 \cdot (-6)$

The integers have different signs.

The product is _____.

So, $5 \cdot (-6) = \underline{\hspace{2cm}}$.

3. $-21 \cdot 0$

The second integer is 0.

The product is _____.

So, $-21 \cdot 0 = \underline{\hspace{2cm}}$.

4. $(-10) \cdot (-7)$

The integers have the same sign.

The product is _____.

So, $(-10) \cdot (-7) = \underline{\hspace{2cm}}$.

SKILL 6: Practice

Tell whether the product is positive, negative, or 0. Then multiply.

1. $-2 \cdot 10$

 $-2 \cdot 10 =$ _____

2. $-8 \cdot (-9)$

 $-8 \cdot (-9) =$ _____

3. $7 \cdot 15$

 $7 \cdot 15 =$ _____

4. $0 \cdot (-23)$

 $0 \cdot (-23) =$ _____

5. $-42 \cdot 3$

 $-42 \cdot 3 =$ _____

6. $-12 \cdot (-15)$

 $-12 \cdot (-15) =$ _____

Multiply.

7. $-2 \cdot 4 =$ _____

8. $-5 \cdot 6 =$ _____

9. $4 \cdot (-5) =$ _____

10. $-1 \cdot (-13) =$ _____

11. $2 \cdot (-8) =$ _____

12. $5 \cdot 19 =$ _____

13. $-3 \cdot (-6) =$ _____

14. $7 \cdot (-4) =$ _____

15. $-8 \cdot 11 =$ _____

16. $-6 \cdot 20 =$ _____

17. $-3 \cdot (-12) =$ _____

18. $-4 \cdot 5 =$ _____

19. $-7 \cdot 7 =$ _____

20. $6 \cdot (-10) =$ _____

21. $-8 \cdot (-15) =$ _____

22. $-20 \cdot (-5) =$ _____

23. $8 \cdot (-30) =$ _____

24. $-20 \cdot 20 =$ _____

25. $-7 \cdot (-13) =$ _____

26. $14 \cdot (-5) =$ _____

27. $25 \cdot 3 =$ _____

28. $9 \cdot (-30) =$ _____

29. $-20 \cdot (-30) =$ _____

30. $0 \cdot (-16) =$ _____

Solve.

31. There was a temperature change of -2°F each hour over a period of 5 hours. In all, what was the temperature change over the 5-hour period? _____

32. The price of a share of stock increased \$3 each week over a 7-week period. What was the total change in the price of a share of the stock over this period of time? _____

TEST PREP

33. Find $-5 \cdot 3$.

A -15

C 2

B -2

D 15

Skill 6

34. Find $-8 + 20$.

F -28

H 12

G -12

J 28

Skill 4



SKILL 7: Division of Integers

In the previous lesson you learned the rules for deciding what sign to use when you multiply two integers. The rules for finding the quotient of two integers match the rules for finding the product.

	<u>Signs of Integers</u>	<u>Answer is:</u>
Multiply or Divide	Same sign →	+
	Different signs →	-

If the number you are dividing is 0, the quotient is 0.
You cannot use 0 as a divisor.

Example

Divide.

- a. $18 \div (-6) = -3$ The integers have different signs, so the quotient is negative.
- b. $-40 \div (-5) = 8$ The integers have the same sign, so the quotient is positive.
- c. $0 \div (-4) = 0$ The number being divided is 0, so the quotient is 0.
- d. $-49 \div 7 = -7$ The integers have different signs, so the quotient is negative.

Guided Practice

Tell whether the quotient is positive, negative, or 0. Then divide.

1. $-35 \div 7$

The integers have different signs.

The quotient is _____.

So, $-35 \div 7 =$ _____.

2. $-54 \div (-9)$

The integers have the same sign.

The quotient is _____.

So, $-54 \div (-9) =$ _____.

3. $100 \div (-2)$

The integers have different signs.

The quotient is _____.

So, $100 \div (-2) =$ _____.

4. $0 \div (-8)$

The integer being divided is 0.

The quotient is _____.

So, $0 \div (-8) =$ _____.

SKILL 7: Practice

Tell whether the quotient is positive, negative, or 0. Then divide.

1. $72 \div (-8)$

$$\underline{\hspace{2cm}}$$
$$72 \div (-8) = \underline{\hspace{2cm}}$$

2. $-45 \div (-9)$

$$\underline{\hspace{2cm}}$$
$$-45 \div (-9) = \underline{\hspace{2cm}}$$

3. $35 \div 5$

$$\underline{\hspace{2cm}}$$
$$35 \div 5 = \underline{\hspace{2cm}}$$

4. $0 \div 2$

$$\underline{\hspace{2cm}}$$
$$0 \div 2 = \underline{\hspace{2cm}}$$

5. $-42 \div 7$

$$\underline{\hspace{2cm}}$$
$$-42 \div 7 = \underline{\hspace{2cm}}$$

6. $-36 \div (-6)$

$$\underline{\hspace{2cm}}$$
$$-36 \div (-6) = \underline{\hspace{2cm}}$$

Divide.

7. $-8 \div (-4) = \underline{\hspace{2cm}}$

8. $-20 \div 4 = \underline{\hspace{2cm}}$

9. $-6 \div 2 = \underline{\hspace{2cm}}$

10. $-12 \div 3 = \underline{\hspace{2cm}}$

11. $-5 \div 5 = \underline{\hspace{2cm}}$

12. $-18 \div 3 = \underline{\hspace{2cm}}$

13. $-45 \div (-5) = \underline{\hspace{2cm}}$

14. $-4 \div (-1) = \underline{\hspace{2cm}}$

15. $-48 \div 6 = \underline{\hspace{2cm}}$

16. $-6 \div (-2) = \underline{\hspace{2cm}}$

17. $0 \div (-5) = \underline{\hspace{2cm}}$

18. $12 \div (-6) = \underline{\hspace{2cm}}$

19. $56 \div 8 = \underline{\hspace{2cm}}$

20. $-35 \div (-7) = \underline{\hspace{2cm}}$

21. $48 \div (-8) = \underline{\hspace{2cm}}$

22. $72 \div (-8) = \underline{\hspace{2cm}}$

23. $-45 \div (-9) = \underline{\hspace{2cm}}$

24. $-35 \div 5 = \underline{\hspace{2cm}}$

25. $-42 \div 7 = \underline{\hspace{2cm}}$

26. $0 \div 2 = \underline{\hspace{2cm}}$

27. $-36 \div (-6) = \underline{\hspace{2cm}}$

28. $18 \div (-2) = \underline{\hspace{2cm}}$

29. $-20 \div (-20) = \underline{\hspace{2cm}}$

30. $0 \div (-16) = \underline{\hspace{2cm}}$

Solve.

31. The total change in the price of a share of stock over a 5-day period was $-\$15$. If the price went down by the same amount each day, what was the change in price each day? _____

32. Mario's weight increased by 18 pounds over 3 years. If the increase was the same each year, how much weight did Mario gain each year? _____

TEST PREP

33. Find $-64 \div (-8)$.

A -8

C 6

B -6

D 8

Skill 7

34. Find $6 - (-10)$.

F -16

H 4

G -4

J 16

Skill 5



SKILL 8: PROBLEM SOLVING: Operations with Integers

Integers are often used to solve problems that involve increases and decreases, gains and losses, or other quantities that may be greater than or less than zero.

Example

A computer store lowered the price of a laptop computer \$45 each month. The store did this over a 6-month period. What was the change in price over this period of time?

Read The price of the laptop decreased by \$45 each month. This happened 6 different times.

Plan What integers describe the situation? The negative integer -45 can be used to represent a *decrease* of \$45. The positive integer 6 represents the number of times the price was lowered. Since the change represented by -45 occurred 6 times, multiply -45 by 6.

Solve Find $6 \cdot (-45)$. You are multiplying integers that have different signs, so the product will be negative.

$$6 \cdot (-45) = -270$$

There was a change of $-\$270$ in the price of the laptop computer.

Look Back Does your answer makes sense? The price changed by almost \$50 in each of 6 months. The number of dollars by which the price changed was almost \$300. Since \$270 is close to \$300, and since the change was a decrease, the answer, $-\$270$, makes sense.

Guided Practice

1. A football team made a 15-yard gain on one play. On the next play, the team had an 8-yard loss. What was the total change? Was it an overall gain or loss?
 - a. The gain can be represented by the integer _____.
 - b. The loss can be represented by the integer _____.
 - c. The total change was _____ yards.
 - d. Since the total change is a positive integer, the team had an overall _____.

SKILL 8: Practice

Use integers to solve each problem.

- In January, Doreen's bank balance decreased by \$50. In February, her balance increased by \$30. What was the total change in her balance?

- Mr. Schultz wanted to write a check for \$85. He noticed that he had only \$80 in his checking account. What integer shows what Mr. Schultz's checking account balance would have been if he had written the check?

- In golf, a score of 0 is called *even par*. One *over par* is represented by +1 and one *under par* is represented by -1. In a golf competition, a player had scores of +2, +1, -2, and 0. What was the player's total score?

- Maria's score changes in a video game were +80, -90, and +40. What was the total change?

- The price of a share of stock dropped \$35 over a 5-day period. The change in price was the same on each of the 5 days. What was the change in price each day?

- On a test, the teacher gave +10 points for each correct answer, 0 points for a skipped question, and -5 points for each incorrect answer. There were 10 questions on the test. Alex had 8 correct answers and 2 incorrect answers. What score did Alex get?

- A mountain climber reached the top of a mountain that was 10,000 ft above sea level. After descending 3,400 ft, he rested for an hour. What was the level at which he rested?

- In a science experiment, the temperature of a liquid dropped 30° over 6 hours. What integer shows the average hourly temperature change of the liquid?

TEST PREP

- The temperature in Bensonville dropped 3°F each hour for 4 hours. What was the total temperature change over the 4-hour period?
Skill 8

A -12°F

C 7°F

B -7°F

D 12°F

- Find $-48 \div (-6)$.

F 9

H -8

G 8

J -9

Skill 7



SKILL 11: Evaluating Algebraic Expressions

Expressions such as $-3n$, $x + 2$, and $6 - \square$ that contain variables are called **algebraic expressions**. The value of an algebraic expression depends on the value of each variable in the expression. You can **evaluate** expressions after replacing each variable with a value. This is known as *substituting* a value for the variable. An expression with numbers but without variables is called a **numerical expression**.

Example 1

Evaluate $7d$ for $d = 3$.

Replace d with 3. The expression becomes $7 \cdot 3$. Multiply: $7 \cdot 3 = 21$.

So, when you evaluate $7d$ for $d = 3$, the result is 21.

Example 2

Evaluate $3 + 2x$, for $x = -1$.

Replace x with -1 . The expression becomes: $3 + \underbrace{2(-1)}$.

Use order of operations to simplify. Multiply first: $3 + \underbrace{(-2)}$

Then add. 1

So, when you evaluate $3 + 2x$, for $x = -1$, the result is 1.

Guided Practice

Evaluate the expression by completing the steps.

1. Evaluate $18 - x$ for $x = 7$.

a. Replace x with its value: $18 - \underline{\hspace{2cm}}$.

b. Subtract: $18 - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$.

c. So, when you evaluate $18 - x$ for $x = 7$, the result is $\underline{\hspace{2cm}}$.

2. Evaluate $3 + 4y$ for $y = -2$.

a. Remember that $4y$ means $4 \cdot y$. Replace y with its value: $3 + 4 \cdot (\underline{\hspace{2cm}})$.

b. Use order of operations to simplify. $3 + (\underline{\hspace{2cm}}) = \underline{\hspace{2cm}}$.

c. So, when you evaluate $3 + 4y$ for $y = -2$, the result is $\underline{\hspace{2cm}}$.

SKILL 11: Practice

Evaluate each algebraic expression for the given value of the variable.

1. $12 + x$ for $x = 4$ _____
2. $20 - k$ for $k = 9$ _____
3. $24 \div n$ for $n = 8$ _____
4. $6t$ for $t = 2$ _____
5. $32 - m$ for $m = -3$ _____
6. $h + (-10)$ for $h = 2$ _____
7. $-3j$ for $j = 9$ _____
8. $p \div (-5)$ for $p = 35$ _____
9. $26 + 2x$ for $x = 7$ _____
10. $30 - 4y$ for $y = 8$ _____
11. $20c \div 10$ for $c = 3$ _____
12. $-3m$ for $m = -11$ _____
13. $6 - 3f$ for $f = 6$ _____
14. $2p - 14$ for $p = 13$ _____
15. $-4 + 8t$ for $t = -5$ _____
16. $100 \div j$ for $j = 5$ _____
17. $3k - 8k$ for $k = 16$ _____
18. $-3m + 15 - m$ for $m = 25$ _____
19. $64g \div 8$ for $g = -7$ _____
20. $200 + k \div 9$ for $k = 63$ _____
21. $2y + 8$ for $y = -3$ _____
22. $18 - 3m$ for $m = -1$ _____
23. $\frac{6}{2n}$ for $n = -3$ _____
24. $9z + 2z$ for $z = -2$ _____

Solve.

25. Mark drives $65t$ miles in t hours. How far does he drive in 2 hours? _____
26. Josefina spent $20 + 3b$ dollars on a pair of earrings and three blouses that cost b dollars each. How much did she spend in all if each blouse cost \$15? _____



27. Evaluate $9 + x$ for $x = -3$.

Skill 11

- A -27 C 6
B -12 D 12

28. Doug bought a book for d dollars and a poster for \$8. What expression represents how much he spent?

Skill 10

- F $8 + d$ H $8d$
G $d - 8$ J $8 \div d$



SKILL 13: Solving 1-Step Equations

To solve an equation, you “undo” operations until the variable is alone on one side of the equation. Remember that addition and subtraction undo each other, and multiplication and division undo each other. Also recall that you can use a fraction to show division. To check the solution, substitute the solution for the variable in the equation.

Example 1

Solve: $x + 7 = 18$.

$$x + 7 = 18$$

$$x + 7 - 7 = 18 - 7 \quad \text{Undo addition by subtracting. Subtract 7 from both sides.}$$

$$x = 11$$

Check: $11 + 7 \stackrel{?}{=} 18$

$$18 = 18$$

The solution is 11.

Example 2

Solve: $5x = -15$.

$$5x = -15$$

$$\frac{5x}{5} = \frac{-15}{5}$$

Undo multiplication by dividing. Divide both sides by 5.

$$x = -3$$

Check: $5(-3) \stackrel{?}{=} -15$

$$-15 = -15$$

The solution is -3 .

Guided Practice

Solve each equation. Check your solution.

1. $x - 3 = 10$

$$x - 3 + \underline{\hspace{1cm}} = 10 + \underline{\hspace{1cm}}$$

$$x = \underline{\hspace{1cm}}$$

Check:

$$\underline{\hspace{1cm}} - 3 \stackrel{?}{=} 10$$

$$\underline{\hspace{1cm}} = \underline{\hspace{1cm}}$$

The solution is $\underline{\hspace{1cm}}$.

2. $8x = -16$

$$\frac{8x}{8} = \frac{-16}{8}$$

$$x = \underline{\hspace{1cm}}$$

Check:

$$8(\underline{\hspace{1cm}}) \stackrel{?}{=} -16$$

$$\underline{\hspace{1cm}} = \underline{\hspace{1cm}}$$

The solution is $\underline{\hspace{1cm}}$.

3. $\frac{x}{7} = 9$

$$\frac{x}{7} (\underline{\hspace{1cm}}) = 9(\underline{\hspace{1cm}})$$

$$x = \underline{\hspace{1cm}}$$

Check:

$$\frac{63}{7} \stackrel{?}{=} 9$$

$$\underline{\hspace{1cm}} = \underline{\hspace{1cm}}$$

The solution is $\underline{\hspace{1cm}}$.

SKILL 13: Practice

Solve each equation.

1. $x + 6 = 14$

$x = \underline{\hspace{2cm}}$

4. $2x = 18$

$x = \underline{\hspace{2cm}}$

7. $m - 10 = -6$

$m = \underline{\hspace{2cm}}$

10. $n - (-8) = 15$

$n = \underline{\hspace{2cm}}$

13. $\frac{n}{-11} = 8$

$n = \underline{\hspace{2cm}}$

16. $x + 23 = 37$

$x = \underline{\hspace{2cm}}$

19. $\frac{k}{-6} = -12$

$k = \underline{\hspace{2cm}}$

22. $x - (-13) = 2$

$x = \underline{\hspace{2cm}}$

2. $x + 9 = 19$

$x = \underline{\hspace{2cm}}$

5. $\frac{n}{5} = 9$

$n = \underline{\hspace{2cm}}$

8. $\frac{k}{-8} = 6$

$k = \underline{\hspace{2cm}}$

11. $-4x = -60$

$x = \underline{\hspace{2cm}}$

14. $x + (-6) = 9$

$x = \underline{\hspace{2cm}}$

17. $x - 13 = -28$

$x = \underline{\hspace{2cm}}$

20. $12y = -84$

$y = \underline{\hspace{2cm}}$

23. $\frac{n}{3} = -14$

$n = \underline{\hspace{2cm}}$

3. $x - 3 = 7$

$x = \underline{\hspace{2cm}}$

6. $(-4)x = 20$

$x = \underline{\hspace{2cm}}$

9. $10x = -70$

$x = \underline{\hspace{2cm}}$

12. $8p = -96$

$p = \underline{\hspace{2cm}}$

15. $-7k = -63$

$k = \underline{\hspace{2cm}}$

18. $\frac{m}{-9} = 20$

$m = \underline{\hspace{2cm}}$

21. $m + (-15) = 30$

$m = \underline{\hspace{2cm}}$

24. $-8x = -168$

$x = \underline{\hspace{2cm}}$

Solve.

25. In a video game, Charles scored -250 points on his second play. This brought his total score to 500 . What was his score on the first play? _____

26. Each day for several days, the change in the price of a share of stock was $-\$3$. The total change in price during those days was $-\$36$. Over how many days did the price decline? _____

TEST PREP

27. What is the solution of $4x = -28$?
Skill 13

A 24

C -24

B -7

D -32

28. Evaluate: $-4(9 + 5)$. Skill 12

F 56

H -41

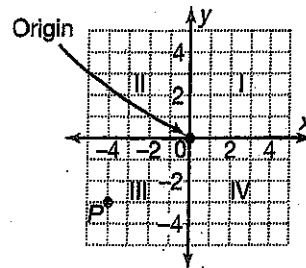
G 41

J -56



SKILL 15: The Coordinate Plane

The **x-y coordinate plane** is based on two number lines. The horizontal line is the **x-axis**, and the vertical line is the **y-axis**. They intersect at the zero point on each number line. This point is called the **origin**. The axes divide the plane into four **quadrants**.



Any point, P , can be described by an **ordered pair**. The first number, the **x-coordinate**, tells how far to the left (for a negative number) or to the right (for a positive number) of the origin the point is. The **y-coordinate** tells how far up (for a positive number) or down (for a negative number) the point is. The origin is at $(0, 0)$.

Example 1

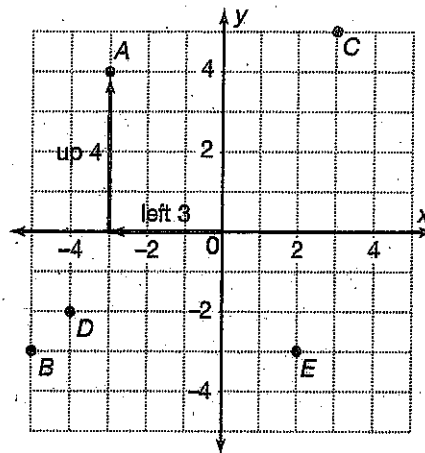
What point is described by $(-3, 4)$?

Move left 3 units.

$(-3, 4)$

Move up 4 units.

$(-3, 4)$ describes point A.



Example 2

Find the coordinates of point B.

Point B is located 5 units to the left of the origin (-5 on the x-axis) and 3 units down (-3 on the y-axis).

So, the coordinates of point B are $(-5, -3)$.

Guided Practice

Refer to the diagram to the right of Examples 1 and 2.

1. What point is described by $(-4, -2)$? 2. What are the coordinates of point C?

Start at the origin.

Move _____ 4 units,
(left/right)

then move _____ 2 units.
(up/down)

You come to point _____.

Start at the origin. To get to point C,

move _____ units, then
(left/right) (how many?)

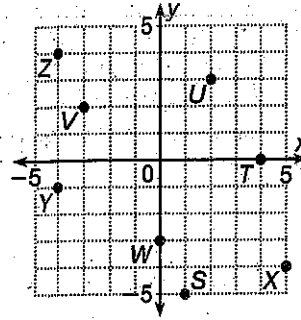
move _____ units. The
(up/down) (how many?)

coordinates of point C are $(\underline{\quad}, \underline{\quad})$.

SKILL 15: Practice

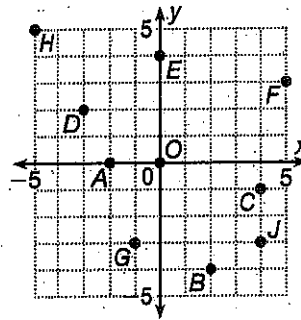
Find the coordinates of each point.

- | | |
|------------|------------|
| 1. S _____ | 2. T _____ |
| 3. U _____ | 4. V _____ |
| 5. W _____ | 6. X _____ |
| 7. Y _____ | 8. Z _____ |



Name the point that has the given coordinates.

- | | |
|-------------------|--------------------|
| 9. (2, -4) _____ | 10. (0, 4) _____ |
| 11. (-3, 2) _____ | 12. (0, 0) _____ |
| 13. (-2, 0) _____ | 14. (-1, -3) _____ |
| 15. (5, 3) _____ | 16. (4, -1) _____ |
| 17. (-5, 5) _____ | 18. (4, -3) _____ |



Solve.

19. A city with streets that run north/south and east/west uses coordinates to identify locations of buildings. The unit of length is 1 city block. How many blocks must a taxi driver travel to get from a bus stop at (2, 5) to a house at (17, 25)?



20. What are the coordinates of a point in the coordinate plane that is 2 units to the right of the origin and 7 units down?

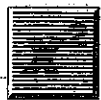
Skill 15

- | | |
|------------|-----------|
| A (-2, -7) | C (2, -7) |
| B (-2, 7) | D (2, 7) |

21. Solve: $6x + 5 = -13$.

Skill 14

- | | |
|-------|------|
| F -18 | H 3 |
| G -3 | J 18 |



SKILL 16: Defining and Comparing Rational Numbers

Rational numbers are numbers that can be written as a ratio of two integers. The denominator can not be zero. Some examples of rational numbers are $\frac{-2}{3}$, $\frac{5}{8}$, $\frac{12}{-7}$, and $\frac{47}{100}$.

Some numbers that at first might not look like rational numbers actually are rational numbers, because they can be written as equivalent fractions with numerators and denominators that are integers. For example, $-\frac{3}{5} = \frac{-3}{5}$, $1.25 = \frac{5}{4}$, and $-0.\bar{3} = \frac{-1}{3}$.

Example 1

Show that each number is a rational number by writing an equivalent fraction with a numerator and a denominator that are both integers.

a. $-4\frac{1}{6}$

$$-4\frac{1}{6} = -\frac{25}{6} = \frac{-25}{6}$$

So $-4\frac{1}{6}$ is a rational number.

b. -0.125

$$-0.125 = -\frac{125}{1,000} = \frac{-1}{8}$$

So -0.125 is a rational number.

You can compare rational numbers in much the same way as you compare fractions, decimals, and integers.

Example 2

Compare $-1\frac{3}{5}$ and $-2\frac{1}{2}$.

Write the rational numbers using the positive common denominator 10.

$$-1\frac{3}{5} = \frac{-8}{5} = \frac{-16}{10} \quad -2\frac{1}{2} = \frac{-5}{2} = \frac{-25}{10}$$

Compare the numerators. Since $-16 > -25$, you know that $\frac{-16}{10} > \frac{-25}{10}$.

So, $-1\frac{3}{5} > -2\frac{1}{2}$.

Guided Practice

1. Write 4.6 as a ratio of two integers.

$$4.6 = 4\frac{\boxed{}}{10} = \frac{\boxed{}}{10}$$

2. Compare $-1\frac{4}{5}$ and $\frac{2}{3}$.

Every negative number is _____
(less/greater)
than every positive number.

So, $-1\frac{4}{5} \bigcirc \frac{2}{3}$.

SKILL 16: Practice

Write each rational number as a ratio of two integers.

1. $-3\frac{3}{4}$ _____

2. $1\frac{6}{7}$ _____

3. -0.8 _____

4. $-\frac{5}{6}$ _____

5. $-4\frac{2}{5}$ _____

6. $-\frac{34}{35}$ _____

7. 0.55 _____

8. $-1.\bar{3}$ _____

9. $8\frac{2}{3}$ _____

Use $>$, $<$, or $=$ to compare the rational numbers.

10. $\frac{2}{3} \bigcirc \frac{1}{4}$

11. $-\frac{2}{3} \bigcirc -\frac{3}{4}$

12. $-5\frac{1}{2} \bigcirc 7\frac{1}{2}$

13. $3\frac{1}{5} \bigcirc -7\frac{2}{5}$

14. $-1\frac{1}{4} \bigcirc -1\frac{1}{5}$

15. $-\frac{3}{4} \bigcirc -\frac{3}{8}$

16. $-5.5 \bigcirc -5\frac{1}{2}$

17. $\frac{2}{3} \bigcirc -\frac{19}{20}$

18. $-3\frac{7}{8} \bigcirc -1\frac{5}{6}$

19. $\frac{4}{5} \bigcirc -12\frac{3}{4}$

20. $0.7 \bigcirc -0.9$

21. $0 \bigcirc -0.3$

22. $-\frac{1}{3} \bigcirc -0.\bar{3}$

23. $\frac{17}{16} \bigcirc -\frac{17}{16}$

24. $0.\bar{6} \bigcirc \frac{2}{3}$

25. $\frac{5}{8} \bigcirc \frac{3}{32}$

26. $-\frac{16}{3} \bigcirc -\frac{14}{3}$

27. $0.75 \bigcirc \frac{3}{4}$

Solve.

28. On Monday, the temperature went down to -15°F at a weather station in Canada. On Tuesday, the temperature dropped to -19.5°F . Which day had the lower temperature? _____

29. Last year, Lucille grew 1.25 inches. Berta grew $1\frac{2}{3}$ inches. Which girl grew more? _____

WEST PREP

30. Which number is greater than $-\frac{2}{3}$?

A $-\frac{1}{3}$

C $-\frac{4}{5}$

B $-\frac{3}{4}$

D -1

Skill 16

31. Find $-7 + 18$.

F -25

H 11

G -11

J 25

Skill 4