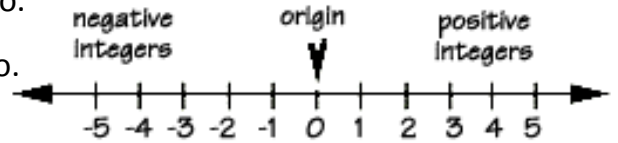


# Integers and Absolute Value

- An integer is any positive or negative whole number from the set {...,-4,-3 -2 -1, 0, 1, 2, 3, 4,...}
- Negative integers are integers \_\_\_\_\_ than zero.
- Positive integers are integers \_\_\_\_\_ than zero.
- \_\_\_\_\_ is neither negative nor positive.



These numbers are **Integers**: 0, 3, -100, 432,  $\frac{10}{2}$ ,  $-\frac{6}{3}$ , 987,654,321

These numbers are **not Integers**: 7.2,  $\frac{10}{4}$ ,  $-\frac{5}{8}$ , -3.7

## Write Integers for Real-Life Situations

a gain of 5 yards on the first down.

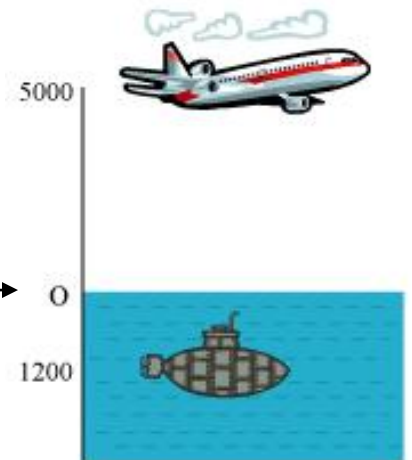
6 feet below sea level

a temperature of 10 degrees below zero.

a \$35 withdrawal

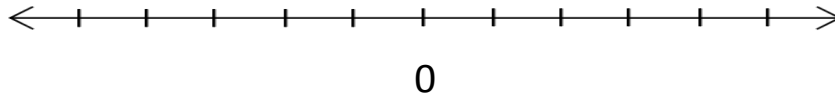
### *You Try! Underline key words*

- |                          |                               |
|--------------------------|-------------------------------|
| a. Lost 6 points         | h. 5000 feet above sea level  |
| b. 3 stokes below par    | i. 7 inches below normal      |
| c. \$5 deposit           | j. \$5 off the original price |
| d. A loss of \$30        | k. ascend 100 meters          |
| e. descend 20 meters     | l. 10 strokes above par       |
| f. 12 centimeters longer | m. 6 yard loss                |
- g. How far away is the plane from the submarine? →
- h. 100 meters ascend and then 20 meters descend



## Graph an Integer on a Number Line

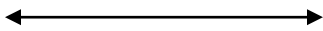
Graph  $-4$  on a number line. Then graph  $3$  on a number line. Which one is greater????



## Compare Integers

Use the  $>$ ,  $<$ , or  $=$  to make a true sentence.

$$-6 \bigcirc -4$$



$$\text{a. } 3 \bigcirc -5$$

$$\text{b. } -5 \bigcirc 0$$

$$\text{c. } 6 \bigcirc -1$$

$$\text{d. } -23 \bigcirc -29$$

**Positive** numbers are always \_\_\_\_\_ than **negative** numbers.

**Zero** is always \_\_\_\_\_ than a positive number, but \_\_\_\_\_ than a negative number.

When comparing **two negative** numbers, imagine them on a number line. The negative number closer to the zero is always \_\_\_\_\_.

## Order Integers

**SCIENCE** The average surface temperatures of Jupiter, Mars, Earth, and the Moon are shown in the table. Order the temperatures from least to greatest (in ascending order).

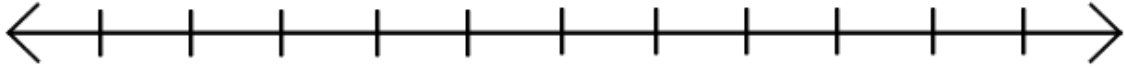
Name	Average Surface Temperature ( $^{\circ}\text{F}$ )
Jupiter	$-162$
Moon	$-10$
Mars	$-81$
Earth	$59$

## Absolute Value

- The \_\_\_\_\_ of an integer is the \_\_\_\_\_ that number is from \_\_\_\_\_ on a number line. (# of steps from zero)
- The absolute value of any number is **ALWAYS** \_\_\_\_\_, or \_\_\_\_\_.

$$|14| = |-14| = 14$$

Evaluate and Graph the expression.  $|-4|$



a.  $|6| =$

b.  $|4| + |-4| =$

c.  $|-7| - |2| + |-1| =$

d.  $|-5| =$

e.  $|9| - |-5| =$

f.  $|-13| + |-7| =$

**Record the absolute value for each integer.**

1)  $|-8| =$

2)  $|5| =$

3)  $|15| =$

4)  $|-13| =$

**Evaluate the problems below.**

5)  $|-22| + 9 =$

6)  $|10| - |-4| =$

7)  $|7| \cdot 9 \cdot |0| =$

8)  $|-100| \div |5| =$

**Compare, using  $<$ ,  $>$ , or  $=$**

9)  $6 \bigcirc |-14|$

10)  $|-17| \bigcirc |17|$

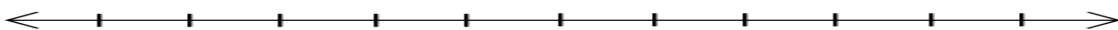
**Order the following from GREATEST to LEAST (descending order).**

11)  $-32, -10, |16|, |-3|, |-30|, 25$  \_\_\_\_\_

### Additive Inverses

Additive inverses are numbers that are the \_\_\_\_\_ distance from zero in \_\_\_\_\_ directions on the number line. When additive inverses are combined through addition, the sum is ZERO.

Write the Additive Inverse of 3. \_\_\_\_\_ Graph 3 and its additive inverse on the number line.

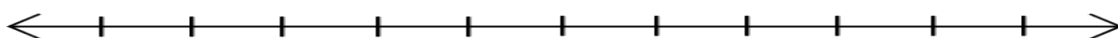


**Write the additive inverse of each number. Graph each pair on the number line.**

a.  $-4$

b.  $8$

c.  $-9$



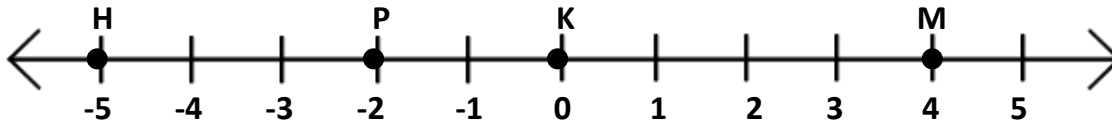
**Practice (1.1)**

Name: \_\_\_\_\_

**Write an integer to represent the situation below:**

- 1) sea level \_\_\_\_\_
- 2) a withdraw of 42 dollars \_\_\_\_\_
- 3) 14 degrees below 0 \_\_\_\_\_
- 4) an increase in height of 3 inches \_\_\_\_\_

**Write the value represented by the point for each letter. Then find its additive inverse (a.i.).**



- 5) K \_\_\_\_\_, a.i.: \_\_\_\_\_
- 6) H \_\_\_\_\_, a.i.: \_\_\_\_\_
- 7) M \_\_\_\_\_, a.i.: \_\_\_\_\_
- 8) P \_\_\_\_\_, a.i.: \_\_\_\_\_

**Evaluate**

- 9)  $|29| =$
- 10)  $|-15| =$
- 11)  $|9| - |-2| =$
- 12)  $|-50| + |-7| =$
- 13) What is the sum of the absolute values of  $-14$  and  $10$ ? \_\_\_\_\_
- 14)  $|-30| - |-4| + |5| =$

**Compare using  $>$ ,  $<$ , or  $=$**

- 15)  $-32 \bigcirc 14$
- 16)  $11 \bigcirc -4$
- 17)  $|-9| \bigcirc |9|$

**Order the following from least to greatest (ascending order).**

- 18)  $-8, 10, 2, -13, -5, 3$  \_\_\_\_\_
- 19)  $-22, -11, |11|, |0|, |-14|, 22, -10$  \_\_\_\_\_

**Order the following from greatest to least (descending order).**

- 20)  $-9, -19, 19, 99, -29, -99, 29$  \_\_\_\_\_

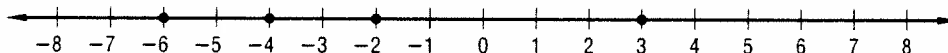
**???** Why is it better to have a positive bank account rather than a negative bank account?

# 2-1 Study Guide and Intervention

## Integers and Absolute Value

The set of **integers** can be written  $\{\dots, -3, -2, -1, 0, 1, 2, 3, \dots\}$  where  $\dots$  means continues indefinitely. Two integers can be compared using an **inequality**, which is a mathematical sentence containing  $<$  or  $>$ .

**Example 1** Use the integers graphed on the number line below for each question.



Replace each  $\circ$  with  $<$  or  $>$  to make a true sentence.

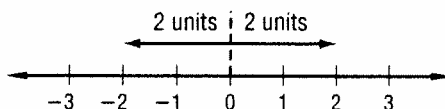
a.  $-6 \circ -2$

$-2$  is greater since it lies to the right of  $-6$ .  
So write  $-6 < -2$ .

b.  $3 \circ -4$

$3$  is greater since it lies to the right of  $-4$ .  
So write  $3 > -4$ .

Numbers on opposite sides of zero and the same distance from zero have the same **absolute value**.



The symbol for absolute value is two vertical bars on either side of the number.  $|2| = 2$  and  $|-2| = 2$

**Example 2** Evaluate each expression.

a.  $|-4|$

$|-4| = 4$

b.  $|-3| + |6|$

$$\begin{aligned} |-3| + |6| &= 3 + 6 & |-3| = 3, |6| = 6 \\ &= 9 & \text{Simplify.} \end{aligned}$$

### Exercises

Replace each  $\circ$  with  $<$ ,  $>$ , or  $=$  to make a true sentence.

1.  $4 \circ -4$

2.  $8 \circ 12$

3.  $-7 \circ -5$

4.  $2 \circ 5$

5.  $-1 \circ 1$

6.  $4 \circ -3$

7.  $6 \circ 8$

8.  $-2 \circ 12$

9.  $9 \circ -1$

10.  $-6 \circ -6$

11.  $5 \circ -3$

12.  $-10 \circ 2$

Evaluate each expression.

13.  $|-6|$

14.  $|15|$

15.  $|-12|$

16.  $|21|$

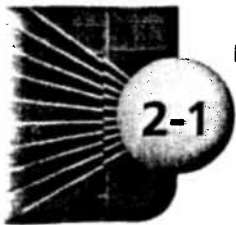
17.  $|4| - |2|$

18.  $|-8| + |-3|$

19.  $|-10| - |-6|$

20.  $|12| + |-4|$

Lesson 2-1

**2-1****Skills Practice****Integers and Absolute Value**

Replace each  $\circlearrowright$  with  $<$ ,  $>$ , or  $=$  to make a true sentence.

- |                              |                               |                              |                               |
|------------------------------|-------------------------------|------------------------------|-------------------------------|
| 1. $1 \circlearrowright 0$   | 2. $-3 \circlearrowright 0$   | 3. $0 \circlearrowright -1$  | 4. $0 \circlearrowright 9$    |
| 5. $-7 \circlearrowright -7$ | 6. $2 \circlearrowright -2$   | 7. $-2 \circlearrowright 8$  | 8. $-4 \circlearrowright 4$   |
| 9. $5 \circlearrowright 5$   | 10. $0 \circlearrowright -6$  | 11. $4 \circlearrowright 10$ | 12. $6 \circlearrowright -6$  |
| 13. $3 \circlearrowright 7$  | 14. $-1 \circlearrowright -2$ | 15. $3 \circlearrowright 4$  | 16. $-3 \circlearrowright -4$ |

Order the integers in each set from least to greatest.

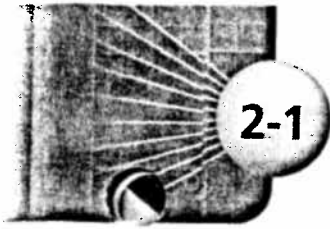
- |                         |                          |                            |
|-------------------------|--------------------------|----------------------------|
| 17. $\{4, -5, 0\}$      | 18. $\{8, -2, 1\}$       | 19. $\{-6, -3, 0\}$        |
| 20. $\{-5, 5, 3, -1\}$  | 21. $\{0, -3, 7, -2\}$   | 22. $\{9, -11, 1, 0\}$     |
| 23. $\{12, -4, 3, -1\}$ | 24. $\{-8, 15, 1, -10\}$ | 25. $\{-12, -17, -20, 2\}$ |

Evaluate each expression.

- |                   |                   |                    |
|-------------------|-------------------|--------------------|
| 26. $ 1 $         | 27. $ -10 $       | 28. $ -8 $         |
| 29. $ 10 $        | 30. $ 4  +  -4 $  | 31. $ 9  -  -5 $   |
| 32. $0 +  -1 $    | 33. $ -6  +  -5 $ | 34. $ -8  -  -8 $  |
| 35. $ 12  +  -3 $ | 36. $ -15  -  6 $ | 37. $ -13  +  -7 $ |

Evaluate each expression if  $a = -3$ ,  $b = 0$ , and  $c = 1$ .

- |                |                |                  |
|----------------|----------------|------------------|
| 38. $ a  - b$  | 39. $ c  + 2$  | 40. $9 -  a $    |
| 41. $ 25  - b$ | 42. $10 -  b $ | 43. $ -8  +  a $ |

**2-1 Practice*****Integers and Absolute Value***

Replace each  $\circlearrowright$  with  $<$ ,  $>$ , or  $=$  to make a true sentence.

1.  $0 \circlearrowright -5$

2.  $10 \circlearrowright -10$

3.  $-8 \circlearrowright 3$

4.  $11 \circlearrowright 11$

5.  $-18 \circlearrowright -18$

6.  $-18 \circlearrowright 18$

7.  $18 \circlearrowright -18$

8.  $18 \circlearrowright 18$

9.  $-120 \circlearrowright -95$

10.  $35 \circlearrowright -12$

11.  $-35 \circlearrowright 12$

12.  $41 \circlearrowright 17$

Order the integers in each set from least to greatest.

13.  $\{-14, -6, -22, 0\}$

14.  $\{-3, 19, 0, -5\}$

15.  $\{-7, 20, -21, 7\}$

16.  $\{15, -1, 4, -3\}$

17.  $\{0, -1, 2, -3, 4\}$

18.  $\{55, 0, -60, 12\}$

19.  $\{-48, -30, -49, -8, 3, -4\}$

20.  $\{27, -9, 3, 0, -2, 29\}$

Evaluate each expression.

21.  $|-7|$

22.  $|14|$

23.  $|-11|$

24.  $|-9| - |6|$

25.  $|-18| - |-8|$

26.  $|-12| + |1|$

27.  $|8 - 4|$

28.  $|23| - |18|$

29.  $|-16| + |-22|$

Evaluate each expression if  $a = -3$ ,  $b = 0$ , and  $c = 1$ .

30.  $|a| - |c|$

31.  $|a| + |c|$

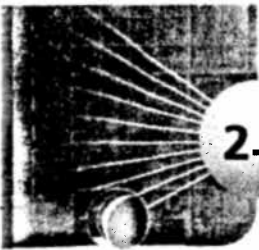
32.  $|ab| + c$

33.  $5 - |ac|$

34.  $c + |-5|$

35.  $c + |5|$

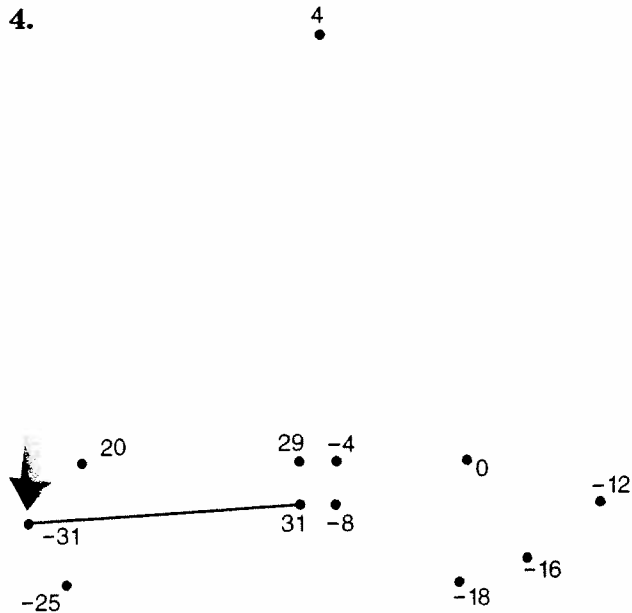
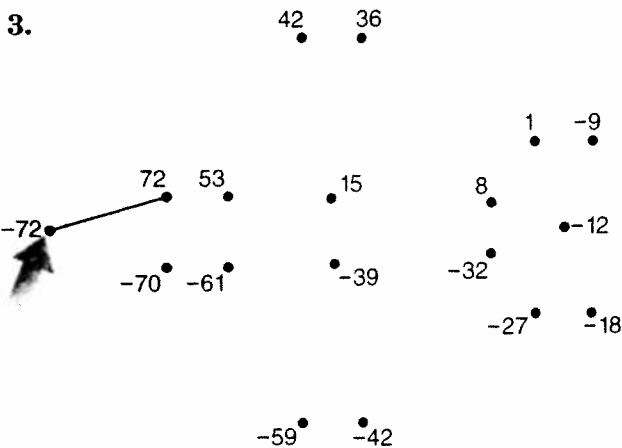
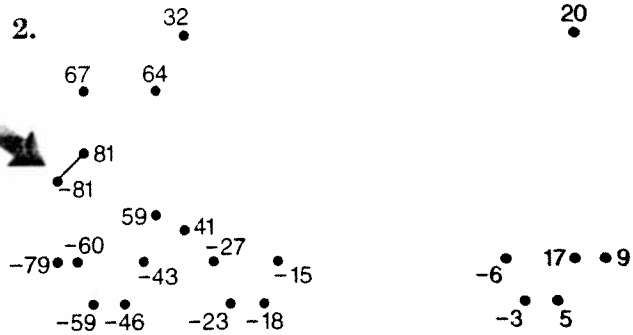
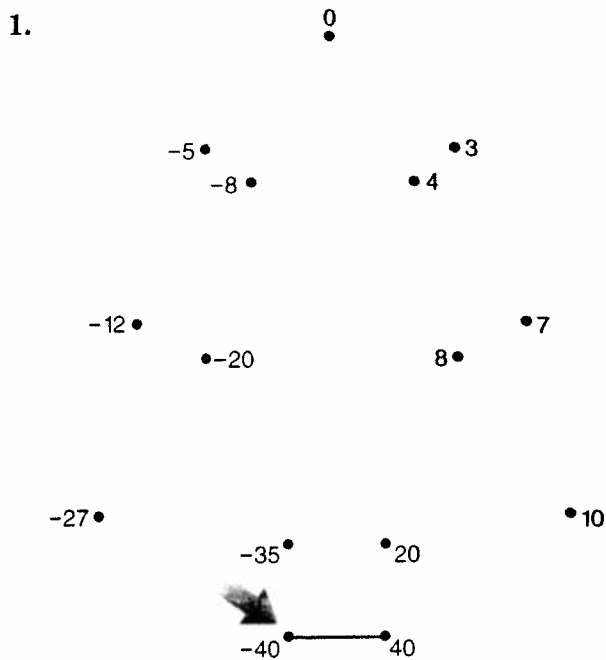
36. **WEATHER** At 6:15 a.m. the temperature was  $-8^{\circ}\text{F}$ . At 12:15 p.m. the temperature was  $-12^{\circ}\text{F}$ . At 6:16 p.m. the temperature was  $-10^{\circ}\text{F}$ . Order the temperatures from least to greatest.



# 2-1 Enrichment

## Integers in Order

Connect the dots in each exercise in the order of the integers shown, from least to greatest. The least integer in each exercise is indicated by the arrow.



Lesson 2-1