

# Opposites and Absolute Value

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Score: \_\_\_\_\_ / 24

## Q Quick Review

Two numbers are **opposites** if they are the same distance from 0 but on different sides — like 7 and  $-7$ . The opposite of a number just flips its sign, and the opposite of 0 is 0. The **absolute value** of a number, written  $|x|$ , is its *distance* from 0 on the number line, so it is never negative. For example,  $|-7| = 7$  and  $|7| = 7$  because both are 7 units from zero. Watch the signs carefully:  $-(-9)$  means “the opposite of  $-9$ ,” which is 9.

◇ **Example:** Find  $|-12|$  and the opposite of  $-12$ .

⇒ Start with absolute value.  $|-12|$  asks: how far is  $-12$  from 0 on the number line? It is 12 units away, so  $|-12| = 12$ . Distance is never negative. Now the opposite: the opposite of a number is found on the other side of 0, the same distance away. The opposite of  $-12$  is 12. Interesting — for this number the absolute value and the opposite turned out the same, because  $-12$  is negative.

**Answer:**  $|-12| = 12$ , opposite = 12

## PRACTICE

Find each value.

- |              |       |                           |       |
|--------------|-------|---------------------------|-------|
| 1. $ 6 $     | _____ | 11. The opposite of 9     | _____ |
| 2. $ -6 $    | _____ | 12. The opposite of $-9$  | _____ |
| 3. $ 15 $    | _____ | 13. The opposite of 14    | _____ |
| 4. $ -7 $    | _____ | 14. The opposite of $-25$ | _____ |
| 5. $ 0 $     | _____ | 15. The opposite of 0     | _____ |
| 6. $ -23 $   | _____ | 16. $-(-5)$               | _____ |
| 7. $ 100 $   | _____ | 17. $-(-8)$               | _____ |
| 8. $ -3/4 $  | _____ | 18. $-(-(-5))$            | _____ |
| 9. $ -12.5 $ | _____ | 19. $ -3  +  4 $          | _____ |
| 10. $ 8.2 $  | _____ | 20. $ -10  -  2 $         | _____ |

## ◆ Word Problems

21. A submarine is at a depth represented by  $-90$  feet. What is its distance from sea level? \_\_\_\_\_
22. Two towns sit on a number line: one at  $-15$  and one at  $15$  (in miles from the city center). How are these two positions related?  
\_\_\_\_\_
23. A bank account balance is  $-\$45$  (overdrawn). How much money is owed? \_\_\_\_\_
24. On a cold morning the temperature was  $-8$  degrees. Later it was the opposite of that. What was the later temperature?  
\_\_\_\_\_



## Answer Keys

- |                                      |   |
|--------------------------------------|---|
| 1. <input type="text" value="6"/>    | 13. <input type="text" value="-14"/>                |
| 2. <input type="text" value="6"/>    | 14. <input type="text" value="25"/>                 |
| 3. <input type="text" value="15"/>   | 15. <input type="text" value="0"/>                  |
| 4. <input type="text" value="7"/>    | 16. <input type="text" value="5"/>                  |
| 5. <input type="text" value="0"/>    | 17. <input type="text" value="8"/>                  |
| 6. <input type="text" value="23"/>   | 18. <input type="text" value="-5"/>                 |
| 7. <input type="text" value="100"/>  | 19. <input type="text" value="7"/>                  |
| 8. <input type="text" value="3/4"/>  | 20. <input type="text" value="8"/>                  |
| 9. <input type="text" value="12.5"/> | 21. <input type="text" value="90 feet"/>            |
| 10. <input type="text" value="8.2"/> | 22. <input type="text" value="They are opposites"/> |
| 11. <input type="text" value="-9"/>  | 23. <input type="text" value="\$45"/>               |
| 12. <input type="text" value="9"/>   | 24. <input type="text" value="8 degrees"/>          |

### Step-by-Step Explanations

- |   |  |
|---|--|
| <p>1. 6 is 6 units from 0, so <math> 6  = 6</math>.</p> <p>2. <math>-6</math> is 6 units from 0, so <math> -6  = 6</math>.</p> <p>3. 15 is 15 units from 0, so <math> 15  = 15</math>.</p> <p>4. <math>-7</math> sits 7 units from 0, so <math> -7  = 7</math>.</p> <p>5. 0 is 0 units from itself, so <math> 0  = 0</math>.</p> <p>6. <math>-23</math> is 23 units from 0, so <math> -23  = 23</math>.</p> <p>7. 100 is 100 units from 0, so <math> 100  = 100</math>.</p> <p>8. <math>-\frac{3}{4}</math> is <math>\frac{3}{4}</math> unit from 0, so the absolute value is <math>\frac{3}{4}</math>.</p> <p>9. <math>-12.5</math> is 12.5 units from 0, so <math> -12.5  = 12.5</math>.</p> <p>10. 8.2 is 8.2 units from 0, so <math> 8.2  = 8.2</math>.</p> <p>11. The opposite flips the sign, so the opposite of 9 is <math>-9</math>.</p> <p>12. The opposite of <math>-9</math> flips the sign to 9.</p> <p>13. Flipping the sign of 14 gives <math>-14</math>.</p> | <p>14. Flipping the sign of <math>-25</math> gives 25.</p> <p>15. 0 is its own opposite — it sits right at the center.</p> <p>16. <math>-(-5)</math> means the opposite of <math>-5</math>, which is 5.</p> <p>17. <math>-(-8)</math> means the opposite of <math>-8</math>, which is 8.</p> <p>18. Work outward: the opposite of <math>-5</math> is 5, and the opposite of 5 is <math>-5</math>.</p> <p>19. <math> -3  = 3</math> and <math> 4  = 4</math>, so the sum is <math>3 + 4 = 7</math>.</p> <p>20. <math> -10  = 10</math> and <math> 2  = 2</math>, so <math>10 - 2 = 8</math>.</p> <p>21. Distance from sea level is the absolute value: <math> -90  = 90</math> feet. Distance is always positive.</p> <p>22. 15 and <math>-15</math> are the same distance from 0 but on opposite sides, so they are opposites.</p> <p>23. The amount owed is the absolute value of the balance: <math> -45  = 45</math>, so \$45 is owed.</p> <p>24. The opposite of <math>-8</math> flips the sign, giving 8 degrees.</p> |
|---|--|



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