

Understanding Positive and Negative Numbers

Name: _____ Date: _____ Score: _____ / 24

Q Quick Review

Positive numbers are greater than 0 and **negative numbers** are less than 0. They describe *opposite directions* from zero: above or below, gain or loss, ahead or behind. On a number line, positives sit to the *right* of 0 and negatives to the *left*. The number 0 is neither positive nor negative — it is the starting point. Real situations often pair up: a deposit of \$5 is +5 while a withdrawal of \$5 is -5; 10 feet above sea level is +10 while 10 feet below is -10.

◇ **Example:** A diver is 15 feet below the surface of the water. Write this as an integer.
 ⇒ First, decide which direction is positive. The surface of the water is our zero point. Going *up* above the surface counts as positive, so going *down* below it counts as negative. The diver is 15 feet *below* the surface, which is the negative direction. So we write the depth as -15. The number 15 tells us how far, and the minus sign tells us the direction is down.

Answer: -15

PRACTICE

Write an integer to represent each situation.

- | | | | |
|-----------------------------------|-------|-------------------------------------|-------|
| 1. A gain of 7 points | _____ | 11. An elevator going up 3 floors | _____ |
| 2. A loss of 4 points | _____ | 12. An elevator going down 4 floors | _____ |
| 3. A deposit of \$20 | _____ | 13. Earning \$25 | _____ |
| 4. A withdrawal of \$15 | _____ | 14. Spending \$18 | _____ |
| 5. 12 feet above sea level | _____ | 15. A score 10 above par | _____ |
| 6. 30 feet below sea level | _____ | 16. A score 2 below par | _____ |
| 7. A temperature of 8° above zero | _____ | 17. A submarine 200 feet underwater | _____ |
| 8. A temperature of 5° below zero | _____ | 18. A plane 500 feet in the air | _____ |
| 9. Walking 6 steps forward | _____ | 19. The number exactly at sea level | _____ |
| 10. Walking 9 steps backward | _____ | 20. A debt of \$40 | _____ |

◆ Word Problems

21. In a card game, Sam first gains 6 points, then loses 6 points. Write an integer for the loss, and explain how it relates to the gain. _____
22. A hiker climbs to 250 feet above the trailhead, then descends into a canyon 80 feet below the trailhead. Write an integer for the canyon position. _____
23. On Monday the temperature was 4 degrees below zero. Write this as an integer and describe its position relative to 0. _____
24. A bank account starts at \$0. After a deposit of \$50 and then a withdrawal of \$50, write integers for the deposit and the withdrawal. _____



Answer Keys

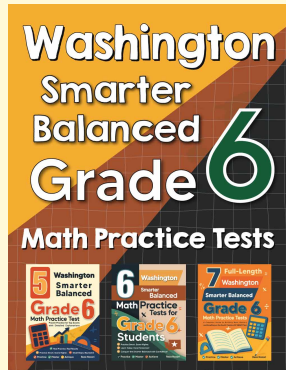
- | | |
|-------------------------------------|--|
| 1. <input type="text" value="+7"/> | 13. <input type="text" value="+25"/> |
| 2. <input type="text" value="-4"/> | 14. <input type="text" value="-18"/> |
| 3. <input type="text" value="+20"/> | 15. <input type="text" value="+10"/> |
| 4. <input type="text" value="-15"/> | 16. <input type="text" value="-2"/> |
| 5. <input type="text" value="+12"/> | 17. <input type="text" value="-200"/> |
| 6. <input type="text" value="-30"/> | 18. <input type="text" value="+500"/> |
| 7. <input type="text" value="+8"/> | 19. <input type="text" value="0"/> |
| 8. <input type="text" value="-5"/> | 20. <input type="text" value="-40"/> |
| 9. <input type="text" value="+6"/> | 21. <input type="text" value="-6"/> |
| 10. <input type="text" value="-9"/> | 22. <input type="text" value="-80"/> |
| 11. <input type="text" value="+3"/> | 23. <input type="text" value="-4"/> |
| 12. <input type="text" value="-4"/> | 24. <input type="text" value="deposit +50, withdrawal -50"/> |

Step-by-Step Explanations

- | | |
|---|--|
| <p>1. A gain is in the positive direction, so it is $+7$.</p> <p>2. A loss is in the negative direction, so it is -4.</p> <p>3. Money going into an account is positive: $+20$.</p> <p>4. Money taken out of an account is negative: -15.</p> <p>5. Above sea level is the positive direction, so $+12$.</p> <p>6. Below sea level is the negative direction, so -30.</p> <p>7. Above zero on a thermometer is positive: $+8$.</p> <p>8. Below zero on a thermometer is negative: -5.</p> <p>9. Forward is the positive direction here, so $+6$.</p> <p>10. Backward is the negative direction, so -9.</p> <p>11. Going up is positive, so $+3$.</p> <p>12. Going down is negative, so -4.</p> <p>13. Earning money is a gain, the positive direction: $+25$.</p> <p>14. Spending money is the negative direction: -18.</p> | <p>15. Above par counts as positive here, so $+10$.</p> <p>16. Below par counts as negative, so -2.</p> <p>17. Underwater is below the surface, the negative direction: -200.</p> <p>18. In the air is above the ground, the positive direction: $+500$.</p> <p>19. Sea level is the zero point — neither positive nor negative.</p> <p>20. A debt means money owed, the negative direction: -40.</p> <p>21. The loss of 6 points is -6. It is the <i>opposite</i> of the gain of $+6$, so together they cancel back to where Sam started.</p> <p>22. The trailhead is the zero point. Below it is the negative direction, so 80 feet below is -80.</p> <p>23. Below zero means the negative direction, so the temperature is -4, sitting 4 units to the left of 0 on a number line.</p> <p>24. A deposit adds money, so it is $+50$; a withdrawal removes money, so it is -50. They are opposites and return the account to \$0.</p> |
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