1-4 Practice

Solving Absolute Value Equations

Evaluate each expression if \( a = -1, b = -8, c = 5, \) and \( d = -1.4. \)

1. \(|6a| = 6\)  
2. \(|2b + 4| = 12\)  
3. \(-10d + a = -15\)  
4. \(|17c| + |3b - 5| = 114\)  
5. \(-6|10a - 12| = -132\)  
6. \(|2b - 1| - |8b + 5| = -52\)  
7. \(|5a - 7| + |3c - 4| = 23\)  
8. \(|1 - 7c| - |a| = 33\)  
9. \(-3|0.5c + 2| - |0.5b| = -17.5\)  
10. \(|4d| + |5 - 2a| = 12.6\)  
11. \(|a - b| + |b - a| = 14\)  
12. \(|2 - 2d| - 3|b| = -19.2\)

Solve each equation. Check your solutions.

13. \(|n - 4| = 13\) \{\(-9, 17\)\}  
14. \(|x - 13| = 2\) \{\(11, 15\)\}  
15. \(|2y - 3| = 29\) \{\(-13, 16\)\}  
16. \(7|x + 3| = 42\) \{\(-9, 3\)\}  
17. \(|3u - 6| = 42\) \{\(-12, 16\)\}  
18. \(|5x - 4| = -6\) \(\emptyset\)  
19. \(-3|4x - 9| = 24\) \(\emptyset\)  
20. \(-6|5 - 2y| = -9\) \{\(1.75, 3.25\)\}  
21. \(|8 + p| = 2p - 3\) \{\(11\)\}  
22. \(|4w - 1| = 5w + 37\) \{\(-38\)\}  
23. \(4|2y - 7| + 5 = 9\) \{3, 4\}  
24. \(-2|7 - 3y| - 6 = -14\) \{1, \(3\frac{2}{3}\)\}  
25. \(2|4 - n| = -3n\) \{\(-8\)\}  
26. \(5 - 3|2 + 2w| = -7\) \{\(-3, 1\)\}  
27. \(5|2r + 3| - 5 = 0\) \{\(-2, -1\)\}  
28. \(3 - 5|2d - 3| = 4\) \(\emptyset\)

29. **WEATHER** A thermometer comes with a guarantee that the stated temperature differs from the actual temperature by no more than 1.5 degrees Fahrenheit. Write and solve an equation to find the minimum and maximum actual temperatures when the thermometer states that the temperature is 87.4 degrees Fahrenheit.

\[|x - 87.4| \leq 1.5; \text{ or } 85.9 \leq x \leq 88.9\]

30. **OPINION POLLS** Public opinion polls reported in newspapers are usually given with a margin of error. For example, a poll with a margin of error of \(\pm 5\)% is considered accurate to within plus or minus 5% of the actual value. A poll with a stated margin of error of 63% predicts that candidate Tonwe will receive 51% of an upcoming vote. Write and solve an equation describing the minimum and maximum percent of the vote that candidate Tonwe is expected to receive.

\[|x - 51| \leq 3 \text{ or } 48 \leq x \leq 54\]