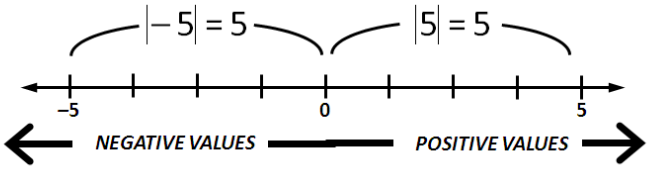
Absolute Value Equations (1A3.0)

Name _____

Class _____ Date _____

Score _____

Absolute value is a number's numerical value without regard to sign. Instead, it is measured by its distance away from 0 on a number line.



$$|100| = 100$$

$$|-x| = x$$

$$|15 - 23| = 8$$

Absolute value equations can have **zero, one, or two solutions**.

For example, the equation |x| = 3 has two solutions:
x = 3 and x = –3.

To solve absolute value equations, first isolate the absolute value, then solve.

Example: Solve for x in the equation |x – 2| + 3 = 10.

Isolate the absolute value: |x – 2| + 3 – 3 = 10 – 3 → |x – 2| = 7

Split the equation: If |x – 2| = 7, then x – 2 can equal 7 or –7.

x - 2 = 7	x - 2 = -7
x = 9	**x = -5**

1) Assume *a* is an integer and solve for *a*.
|*a* + 8| = 11

A. {3, 5}
B. {3, 19}
C. {3, -5}
D. {3, -19}

2) If *y* is an integer, then which of the following is the solution set for |4*y* – 4| = 12?

A. {-4, 4}
B. {-2, 4}
C. {-2, -4}
D. {2, 4}

3) If *b* is an integer, which of the following is the solution set for |*b* - 9| = 2?

A. {7, 11}
B. {5, 11}
C. {-2, 11}
D. {-7, 11}

4) Assume *x* is an integer and solve for *x*.
|3 - 2*x*| = 13

A. {-5}
B. {5}
C. {8, -5}
D. {4, 8}

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5) If x is an integer, which of the following is the solution set for $|1 - x| = 2$?

A. {1, 4}
B. {-1, 1}
C. {3, 4}
D. {-1, 3}

6) Assume z is an integer and solve for z.
$\frac{|z|}{6} = 72$

A. {9, -12}
B. {-9, 8}
C. {-12, 8}
D. {-12, 12}

7) Assume z is an integer and solve for z.
$2|z| + 1 = 3$

A. {1, 2}
B. {1, 3}
C. {1, -2}
D. {1, -3}

8) If z is an integer, which of the following is the solution set for $-5|z + 2| = -15$?

A. {-5, 1}
B. {-5, 3}
C. {-3, 5}
D. {1, -3}

9) If z is an integer, which of the following is the solution set for $10|2 - z| = 110$?

A. {9, -8}
B. {-9, 13}
C. {13, -8}
D. {11, -13}

10) Assume a is an integer and solve for a.
$|2a - 5| = 17$

A. {22, -1}
B. {-2, 12}
C. {-1, 11}
D. {-2, 22}

11) If a is an integer, which of the following is the solution set for $|2a + 5| < 3$?

A. {-3}
B. {-2, -3}
C. {-1, -2, -3}
D. {-1, -2, -3, -4}

12) If b is an integer, what is the solution set for $|b| + 1 < 3$?

A. {-2, 2}
B. {-2, -1, 1, 2}
C. {-1, 0, 1}
D. {-2, -1, 0, 1, 2}

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13) If *x* is an integer, which of the following is the solution set for $|3x + 2| < 9$?

A. {-4, -3, -2, -1}
B. {0, 1, 2, 3}
C. {-3, -2, -1, 0, 1, 2}
D. {-4, -3, -2, -1, 0, 1, 2, 3}

14) If *z* is an integer, which of the following is the solution set for $\left|\frac{z}{2} + 1\right| < 3$?

A. {-2, 1}
B. {-1, 0}
C. {-2, -1}
D. {-2, -1, 0}

15) If *y* is an integer, which of the following is the solution set for $|2y| < 4$?

A. {1, 2}
B. {1, 0}
C. {-2, -1, 0}
D. {-1, 0, 1}

16) Which of the following describes all possible values for *x* in the equation $|x - 3| \geq 9$?

A. $x > 12$ or $x < -6$
B. $x \geq 12$ or $x \geq 6$
C. $x \geq 12$ or $x \leq -6$
D. $x \leq -12$ or $x \geq -6$