What is Absolute Value?

Worksheet

The absolute value of x, written |x|, equals x if x is positive or zero, and x if x is negative - it's always the non-negative distance from zero.

$$|x| = \begin{cases} x & \text{if } x \geq 0 \\ -x & \text{if } x < 0 \end{cases}$$

Questions

1. What is |12|?

A) -12
B) 12
C) 0
D) 144

2. Solve |x| = 7.

A) x = 7 only
B) x = 7 only
C) x = 7 or x = 7
D) No solution

3. What is |3 8|?

A) 5
B) -5
C) 11
D) -11

4. Which is true for all real x?

A) |x| < 0
B) |x| = x always
C) |x| 0
D) |x| = -x always

5. Find |9|.

6. Solve |x 3| = 5.

7. Simplify |4| |6|.

8. Define: What does |x| mean?

9. Define: Is |x| ever negative?

10. Define: How do you solve |x| = a?

Answer Key

1. B) 12 - Absolute value strips the sign: |12| = 12.
2. C) x = 7 or x = 7 - Both 7 and 7 are 7 units away from zero.
3. A) 5 - 3 8 = 5, and |5| = 5.
4. C) |x| 0 - Absolute value is never negative - it's always zero or positive.
5. 9 is negative, so |9| = (9) |9| = 9
6. x 3 = 5 or x 3 = 5 x = 8 or x = 2
7. |4| = 4, |6| = 6 4 6 = 2
8. The distance of x from zero on the number line - always 0.
9. No - the absolute value output is always zero or positive.
10. It splits into two equations: x = a or x = a (for a 0).