Opposites and Absolute Value

Opposites and absolute value: Models and calculations

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QUICK REVIEW

The opposite of a is $-a$: the opposite of -16 is 16 because $-16 + 16 = 0$. Absolute value is distance from zero, so $|-16| = |16| = 16$. Opposites may be negative, but an absolute value is never negative.

Worked example

Find the opposite of -18 and check it.

1. Change direction while keeping distance 18: the opposite of -18 is 18.
2. Check $-18 + (18) = 0$ and $|-18| = |18| = 18$.
Answer: 18.

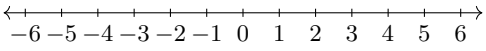
Practice Problems

Show your thinking.

1. Find $|-9|$.

2. Find the opposite of 4.

3. Mark -5 and its opposite on a number line. State the opposite.



4. Find $|0|$ and explain its distance.

5. A debt is -12 dollars. Find the size of the debt.

6. Find x if $x + 8 = 0$.

7. Find the opposite of -14.

8. Find $|6|$; explain why a positive input keeps its value.

Answer Key

1. 9.
2. -4.
3. Marks at -5 and $+5$; the opposite is $+5$.
4. 0.
5. 12 dollars of debt.
6. -8.
7. 14.
8. 6.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. -9 is 9 units from 0.

2. Thus $|-9| = 9$; the two coordinates at that distance are -9 and 9.

Problem 2

1. Change direction while keeping distance 4: the opposite of 4 is -4.

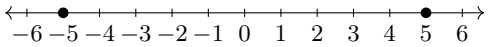
2. Check $4 + (-4) = 0$ and $|4| = |-4| = 4$.

Problem 3

1. Change direction while keeping distance 5: the opposite of -5 is 5.

2. Check $-5 + (5) = 0$ and $|-5| = |5| = 5$.

3. Mark -5 five ticks left of zero and $+5$ five ticks right.



Problem 4

1. The point 0 is already at the reference point, so it is 0 units away.

2. Therefore $|0| = 0$. It is the only point at that distance, and $-0 = 0$ is its own opposite.

Problem 5

1. The negative sign in -12 dollars records money owed.

2. The size is its distance from zero: $|-12| = 12$ dollars.

Problem 6

1. Change direction while keeping distance 8: the opposite of 8 is -8.

2. Check $8 + (-8) = 0$ and $|8| = |-8| = 8$.

Problem 7

1. Change direction while keeping distance 14: the opposite of -14 is 14.

2. Check $-14 + (14) = 0$ and $|-14| = |14| = 14$.

Problem 8

1. 6 is 6 units from 0.

2. Thus $|6| = 6$; the two coordinates at that distance are -6 and 6.

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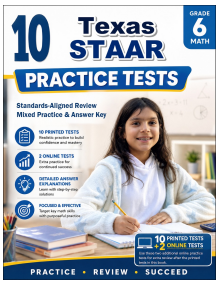

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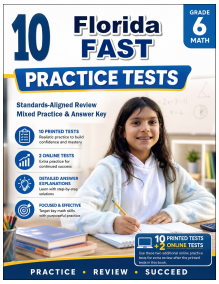

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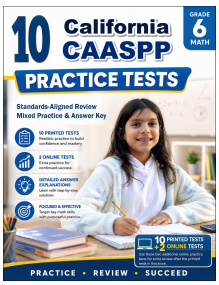

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