Opposites and Absolute Value

Opposites and absolute value: Mistakes and missing information

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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. Correct the claim $|-6| = -6$.

2. A student says the opposite of -3 is -3. Correct it.

3. Find the number whose opposite is 11.

4. Is $|-8|$ less than $|5|$? Compute both to decide.

5. Find the number that is its own opposite.

6. A student gets -10 for $|10|$. Correct the sign.

7. A student reports $|-17| = 17$ but says it is a signed location. Find the distance and distinguish it from the location.

8. Find every integer x with $|x| = 5$.

Answer Key

1. 6.
2. 3.
3. -11.
4. $8 > 5$; no.
5. Only 0 is its own opposite.
6. 10.
7. Distance 17 units; signed coordinate -17.
8. $x = -5$ or $x = 5$.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. -6 is 6 units from 0.

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

Problem 2

1. Change direction while keeping distance 3: the opposite of -3 is 3.

2. Check $-3 + (3) = 0$ and $|-3| = |3| = 3$.

Problem 3

1. The unknown satisfies $-x = 11$.

2. Take the opposite of both sides: $x = -11$. Check $-(-11) = 11$.

Problem 4

1. -8 is 8 units from 0.

2. Thus $|-8| = 8$; the two coordinates at that distance are -8 and 8.

3. $|-8| = 8$ and $|5| = 5$, with $8 - 5 = 3 > 0$.

Problem 5

1. Being its own opposite means $x = -x$. Add x to both sides: $2x = 0$.

2. Divide by 2 to get $x = 0$. Check $-0 = 0$.

Problem 6

1. 10 is 10 units from 0.

2. Thus $|10| = 10$; the two coordinates at that distance are -10 and 10.

Problem 7

1. -17 is 17 units from 0.

2. Thus $|-17| = 17$; the two coordinates at that distance are -17 and 17.

3. The location -17 is on the negative side of 0; its distance is the nonnegative value 17.

Problem 8

1. $|-5| = 5$, so -5 works.

2. $|5| = 5$ too; these are the two points 5 units from zero.

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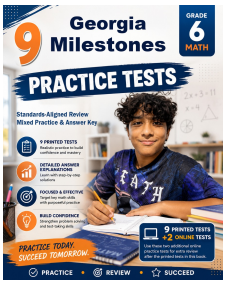

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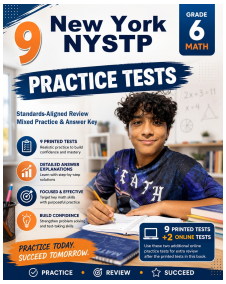

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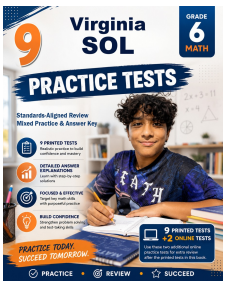

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