Integers and Their Opposites

Explore ideas and representations

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QUICK REVIEW

Opposites are the same distance from zero on different sides. The opposite of -2 is 2, and $-2 + 2 = 0$. Absolute value is nonnegative distance: $|-2| = 2$. Zero is its own opposite.

Worked example

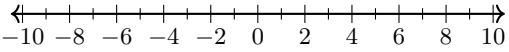
A lift is on floor -3. Which floor is opposite it across floor 0, and how many floors apart are they?

1. Negate the floor number: $-(-3) = 3$.
2. Both floors are 3 levels from zero: $|-3| = |3| = 3$.
3. Their separation is $3 - (-3) = 6$ levels.
Answer: Floor 3; 6 levels apart.

Practice Problems

Show your thinking.

1. Plot -4 and its opposite. Give both distances from 0.

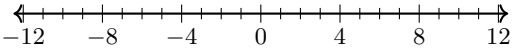


2. Find the opposite of 8 and the opposite of that result.

3. Compare $-(-4)$ and $-|-4|$.

4. Complete this statement: $x + (-12) = 0$. Find x and its distance from zero.

5. Write $-8, 0, 4, -4$ from least to greatest. Use the line to check.



6. Find two opposite integers with distance 8 between them.

7. Signal record: state the opposite of -13, its absolute value, and the sum of the two opposites.

8. Distance marker: find x in $x + (17) = 0$ and verify the cancellation.

9. Balance check: list the pair -19 and its opposite, then find their distance apart.

10. Reference scale: evaluate $-|23|$ and distinguish it from the opposite of 23.

Answer Key

1. $-4, 4$; both distances 4.
2. -8, then 8.
3. 4 and -4; the first is greater.
4. $x = 12$; distance 12.
5. $-8 < -4 < 0 < 4$.
6. -4 and 4.
7. Opposite 13; absolute value 13; sum 0.
8. $x = -17$.
9. $-19, 19$; distance 38.
10. $-|23| = -23$; opposite of 23 is -23.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. The opposite of -4 is 4.
2. From 0, mark -4 at the 4th unit tick left and 4 at the 4th unit tick right.
3. $|-4| = 4$ and $|4| = 4$, so each point is 4 units from 0.

Problem 2

1. First opposite: $-(8) = -8$.
2. Second opposite: $-(-8) = 8$.
3. Check $8 + (-8) = 0$.

Problem 3

1. $-(-4) = 4$.
2. $-|-4| = -4$.
3. $4 - (-4) = 8 > 0$.

Problem 4

1. x must cancel -12.
2. $x = -(-12) = 12$.
3. Check $12 + (-12) = 0$; $|12| = 12$.

Problem 5

1. Because $8 > 4$, reversing signs gives $-8 < -4$.
2. Both are negative: $-8 < 0$ and $-4 < 0$.
3. $4 > 0$, so the ordered list is $-8, -4, 0, 4$.

Problem 6

1. Each distance from zero must be $8 \div 2 = 4$.
2. The two signed integers are -4 and 4.
3. Check separation $4 - (-4) = 8$ and sum 0.

Problem 7

1. Absolute value $|-13| = 13$.
2. Opposite $= -(-13) = 13$.
3. Zero-sum check: $-13 + (13) = 0$.

Problem 8

1. Undo addition: $x = 0 - (17) = -17$.
2. Opposite $= -(17) = -17$.
3. Zero-sum check: $17 + (-17) = 0$.

Problem 9

1. Absolute value $|-19| = 19$.
2. Opposite $= -(-19) = 19$.
3. Distance $= 19 - (-19) = 38$ units.

Problem 10

1. Absolute value $|23| = 23$.
2. Opposite $= -(23) = -23$.
3. Negating the distance gives $-23 = -23$; negating the original value gives -23.

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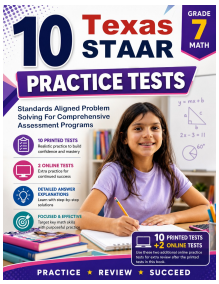

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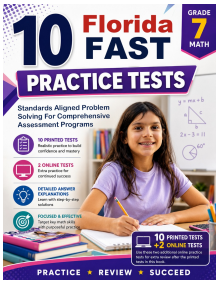

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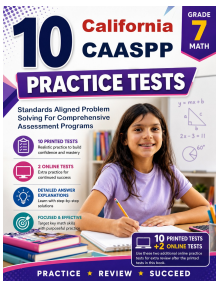

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