Opposites and Absolute Value

Opposites and absolute value: Applications and decisions

Name _____ **Date** _____ **Score** _____ / 8

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. A diver is at -15 m. Find distance from sea level.

2. Design a signed temperature opposite to $+7°$C.

3. A score change is -20. Find the change that cancels it.

4. Locations are at -4 km and $+6$ km from camp. Is the first farther? Compare distances.

5. A location is 13 units right of zero. Find its distance from zero.

6. A student models the opposite of a -2-floor location as -2. Correct the model.

7. A balance is -23 dollars. Find the amount of the debt without a sign.

8. Two markers must be opposite and 18 units apart. Design their integer coordinates.

Answer Key

1. 15 m from sea level.
2. $-7°$C.
3. $+20$ points.
4. 4 km and 6 km; no.
5. 13 units.
6. $+2$, two floors above the reference.
7. 23 dollars of debt.
8. -9 and 9.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. -15 is 15 units from 0.

2. Thus $|-15| = 15$; the two coordinates at that distance are -15 and 15.

Problem 2

1. Change direction while keeping distance 7: the opposite of 7 is -7.

2. Check $7 + (-7) = 0$ and $|7| = |-7| = 7$.

Problem 3

1. Change direction while keeping distance 20: the opposite of -20 is 20.

2. Check $-20 + (20) = 0$ and $|-20| = |20| = 20$.

Problem 4

1. -4 is 4 units from 0.

2. Thus $|-4| = 4$; the two coordinates at that distance are -4 and 4.

3. $|-4| = 4$ and $|6| = 6$ km, so the first is 2 km closer.

Problem 5

1. 13 is 13 units from 0.

2. Thus $|13| = 13$; the two coordinates at that distance are -13 and 13.

Problem 6

1. Change direction while keeping distance 2: the opposite of -2 is 2.

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

Problem 7

1. -23 is 23 units from 0.

2. Thus $|-23| = 23$; the two coordinates at that distance are -23 and 23.

3. The negative balance indicates money owed; the amount owed is $|-23| = 23$ dollars.

Problem 8

1. Each marker is $18/2 = 9$ units from zero.

2. The points $-9, 9$ are opposites and $9 - (-9) = 18$ units apart.

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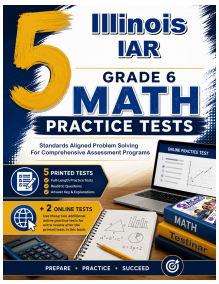

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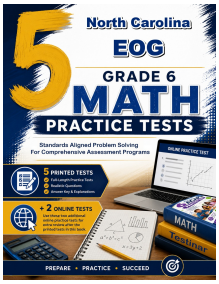

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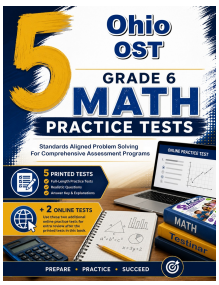

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