Subtracting Integers

Apply the skill to decisions and designs

Name _____ **Date** _____ **Score** _____ / 10

QUICK REVIEW

Subtracting means adding the opposite: $a - b = a + (-b)$. For example, $-3 - (-8) = -3 + 8 = 5$; $4 - 7 = -3$. A number-line move for subtraction is opposite to the sign of the subtracted number.

Worked example

Evaluate $(-3) - (2)$. Show an exact fraction or integer.

1. Use denominator 1: $-3 = -3/1$ and $2 = 2/1$.
2. Combine the signed numerators: $-3 - (2) = -5$.
3. The value is $-5/1 = -5$.
Answer: -5.

Practice Problems

Show your thinking.

1. Weather station: a signed model gives $(-7) - (3)$ meters. Find the signed result and interpret a negative result as below the reference level.

2. Balance log: plan A changes a balance by $(5) - (-9)$ dollars; plan B changes it by 12 dollars. Which leaves a larger balance from the same start, and by how much?

3. Sensor calibration: an unknown first reading combined with (-2) by the operation $-$ gives -4. Recover the first reading.

4. Target design: choose x so that $[(8) - (-4)] + x = 15$. Determine x and verify the target.

5. Spending plan: the signed change is $(-3) - (7)$ dollars. Starting at 20 dollars, find the final balance.

6. Snow-depth log: one day's signed change is $(4) - (-6)$ cm. Find the total change over 3 identical days.

7. Water record: a signed volume change is $(-8) - (5)$ liters. Compare with a target change of -12 liters and find the gap.

8. Elevation log: two readings are 0 and $(9) - (-3)$ meters. Find the second reading and its distance from zero.

9. Freezer log: plan A changes a balance by $(-14) - (9)$ dollars; plan B changes it by -25 dollars. Which leaves a larger balance from the same start, and by how much?

10. Credit adjustment: choose x so that $[(17) - (-8)] + x = 28$. Determine x and verify the target.

Answer Key

1. -10 meters; below the reference level.
2. Plan A by 2 dollars.
3. -6.
4. $x = 3$.
5. 10 dollars.
6. 30 cm.
7. Signed change -13 liters; 1 liter below target.
8. Reading 12 m; distance 12 m.
9. Plan A by 2 dollars.
10. $x = 3$.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. Use denominator 1: $-7 = -7/1$ and $3 = 3/1$.
2. Combine the signed numerators: $-7 - (3) = -10$.
3. The value is $-10/1 = -10$.

Problem 2

1. Use denominator 1: $5 = 5/1$ and $-9 = -9/1$.
2. Combine the signed numerators: $5 - (-9) = 14$.
3. The value is $14/1 = 14$.
4. $14 - (12) = 2$ dollars.

Problem 3

1. Add back the amount that was subtracted.
2. $x = (-4) + (-2) = -6$.
3. Check in the original: $(-6) - (-2) = -4$.

Problem 4

1. Use denominator 1: $8 = 8/1$ and $-4 = -4/1$.
2. Combine the signed numerators: $8 - (-4) = 12$.
3. The value is $12/1 = 12$.
4. $x = 15 - (12) = 3$; check $12 + 3 = 15$.

Problem 5

1. Use denominator 1: $-3 = -3/1$ and $7 = 7/1$.
2. Combine the signed numerators: $-3 - (7) = -10$.
3. The value is $-10/1 = -10$.
4. Final $= 20 + (-10) = 10$ dollars.

Problem 6

1. Use denominator 1: $4 = 4/1$ and $-6 = -6/1$.
2. Combine the signed numerators: $4 - (-6) = 10$.
3. The value is $10/1 = 10$.
4. Three days: $3(10) = 30$ cm.

Problem 7

1. Use denominator 1: $-8 = -8/1$ and $5 = 5/1$.
2. Combine the signed numerators: $-8 - (5) = -13$.
3. The value is $-13/1 = -13$.
4. Gap: $-12 - (-13) = 1$ liter.

Problem 8

1. Use denominator 1: $9 = 9/1$ and $-3 = -3/1$.
2. Combine the signed numerators: $9 - (-3) = 12$.
3. The value is $12/1 = 12$.
4. Distance $= |12 - 0| = 12$ m.

Problem 9

1. Use denominator 1: $-14 = -14/1$ and $9 = 9/1$.
2. Combine the signed numerators: $-14 - (9) = -23$.
3. The value is $-23/1 = -23$.
4. $-23 - (-25) = 2$ dollars.

Problem 10

1. Use denominator 1: $17 = 17/1$ and $-8 = -8/1$.
2. Combine the signed numerators: $17 - (-8) = 25$.
3. The value is $25/1 = 25$.
4. $x = 28 - (25) = 3$; check $25 + 3 = 28$.

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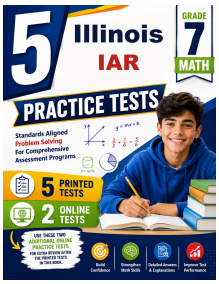

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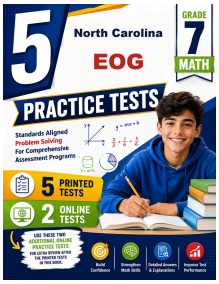

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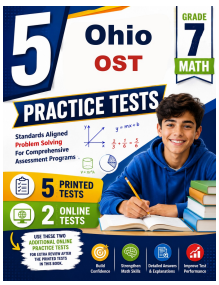

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