Solving Basic Equations & Integer Operations

Pre-Algebra Worksheet · Grade 6–8

Name: _____ Date: _____

Learning Objectives

- Add and subtract integers using number line reasoning
- Identify and apply additive and multiplicative inverses
- Solve one-step and two-step algebraic equations

Problems

1. Solve the subtraction problem using the number line. Start at 7 and move 2 units in the negative direction.

$7 - 2 = ?$

2. Solve the subtraction problem. Start at 3 and move 8 units in the negative direction. Be careful to include the correct sign in your answer.

$3 - 8 = ?$

3. Use the number line concept to solve the following subtraction. Start at 9 and move 11 units in the negative direction.

$9 - 11 = ?$

4. Solve the following problem involving negative integers. Start at negative 2 and move 5 units further in the negative direction.

$-2 - 5 = ?$

5. Find the additive inverse of 7. The additive inverse is the number you must add to 7 so that the result equals 0.

$7 + ? = 0$

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6. Find the multiplicative inverse of 4. The multiplicative inverse is the number you must multiply by 4 so that the result equals 1.

$4 \times ? = 1$

7. Solve the one-step equation for x by using the concept of additive inverse.

$x + 5 = 12$

8. Solve the one-step equation for x by using the concept of multiplicative inverse.

$3x = 21$

9. Solve the two-step equation for x. First apply the additive inverse, then the multiplicative inverse.

$2x - 6 = 10$

10. Solve the two-step equation for x involving negative integers. Apply both additive and multiplicative inverse properties.

$-4x + 3 = -13$

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Solving Basic Equations & Integer Operations — Answer Key

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Answer Key

1. Answer: 5
- Start at 7 on the number line.
- Move 2 units to the left (negative direction): 7 → 6 → 5.
- Answer: 5

2. Answer: -5
- Start at 3 on the number line.
- Move 8 units to the left: 3 → 2 → 1 → 0 → -1 → -2 → -3 → -4 → -5.
- Answer: -5

3. Answer: -2
- Start at 9 on the number line.
- Move 11 units to the left: 9 crosses 0 and reaches -2.
- Answer: -2

4. Answer: -7
- Start at -2 on the number line.
- Move 5 more units to the left: -2 → -3 → -4 → -5 → -6 → -7.
- Answer: -7

5. Answer: -7
- The additive inverse of a number n is -n.
- So the additive inverse of 7 is -7.
- Check: 7 + (-7) = 0 ✓

6. Answer: 1/4
- The multiplicative inverse (reciprocal) of a number n is 1/n.
- So the multiplicative inverse of 4 is 1/4.
- Check: 4 × (1/4) = 1 ✓

7. Answer: x = 7
- To isolate x, add the additive inverse of 5 (which is -5) to both sides.
- x + 5 + (-5) = 12 + (-5)
- x = 7

8. Answer: x = 7
- To isolate x, multiply both sides by the multiplicative inverse of 3, which is 1/3.

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- (1/3) × 3x = 21 × (1/3)
- x = 7

9. Answer: x = 8

- Step 1: Add the additive inverse of -6 (which is +6) to both sides: 2x - 6 + 6 = 10 + 6 → 2x = 16.
- Step 2: Multiply both sides by the multiplicative inverse of 2 (which is 1/2): x = 16 × (1/2).
- x = 8

10. Answer: x = 4

- Step 1: Add the additive inverse of 3 (which is -3) to both sides: -4x + 3 - 3 = -13 - 3 → -4x = -16.
- Step 2: Multiply both sides by the multiplicative inverse of -4 (which is -1/4): x = -16 × (-1/4).
- x = 4

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