

Real Numbers in Word Problems

Algebra Worksheet · Grade 7–9

Name: _____

Date: _____

Learning Objectives

- Translate verbal statements involving real numbers into algebraic expressions and equations
- Identify and apply additive inverses (opposites) of integers, fractions, and decimals
- Solve real-life word problems using real numbers including fractions, decimals, and negatives

Problems

1. Find the opposite (additive inverse) of 15.

Opposite of 15 = ?

2. Find the additive inverse of negative 7.8.

Additive inverse of $-7.8 = ?$

3. Find the opposite of the fraction 5 over 6. Be careful — the opposite is NOT the reciprocal.

Opposite of $\frac{5}{6} = ?$

4. Translate the following statement into an algebraic expression: 'Eight more than one half of a number n.'

$\frac{1}{2}n + 8$

5. Translate this statement into an equation and solve: 'A number increased by 4.5 is equal to 12.' Find the number.

$x + 4.5 = 12$

6. Emma is 3 years older than one half of her brother Jake's age. Emma is 11 years old. Write an equation and find Jake's age.

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$$\frac{1}{2}j + 3 = 11$$

7. The temperature this morning was negative 4.5 degrees. By afternoon it rose by 11.2 degrees. What is the afternoon temperature? Write an expression and evaluate it.

$$-4.5 + 11.2$$

8. Marcus is 6 years more than two thirds of his sister Lia's age. Marcus is 18 years old. Write an equation and solve for Lia's age.

$$\frac{2}{3}x + 6 = 18$$

9. A scuba diver is at an elevation of negative 12.75 meters (below sea level). She descends an additional one fourth of her current depth. Write an expression for her new elevation and calculate it.

$$-12.75 + \frac{1}{4} \times (-12.75)$$

10. Carlos earns a base wage plus a commission. His total weekly earnings in dollars equal three and one half times the number of units he sold, plus a base pay of 125.50 dollars. If Carlos earned 423 dollars last week, how many units did he sell? Write and solve an algebraic equation.

$$3.5u + 125.50 = 423$$

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Real Numbers in Word Problems — Answer Key

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Answer Key

1. Answer: -15

- The opposite of a number switches its sign.
- The opposite of 15 is -15.
- Check: $15 + (-15) = 0$ ✓

2. Answer: 7.8

- The additive inverse switches the sign of the number.
- The additive inverse of -7.8 is +7.8.
- Check: $-7.8 + 7.8 = 0$ ✓

3. Answer: -5/6

- The opposite switches the sign, not the numerator and denominator.
- Opposite of $5/6 = -5/6$ (NOT $6/5$).
- Check: $5/6 + (-5/6) = 0$ ✓

4. Answer: $(1/2)n + 8$

- 'One half of n' means multiplication: $(1/2) \times n = (1/2)n$.
- 'Eight more than' means add 8.
- Combined expression: $(1/2)n + 8$.

5. Answer: $x = 7.5$

- 'A number increased by 4.5' translates to $x + 4.5$.
- 'Is equal to 12' translates to $= 12$.
- Equation: $x + 4.5 = 12$.
- Subtract 4.5 from both sides: $x = 12 - 4.5 = 7.5$.

6. Answer: Jake is 16 years old

- 'One half of Jake's age' = $(1/2)j$.
- '3 years older' means add 3: $(1/2)j + 3$.
- 'Emma is 11' gives the equation: $(1/2)j + 3 = 11$.
- Subtract 3 from both sides: $(1/2)j = 8$.
- Multiply both sides by the reciprocal 2: $j = 16$.
- Jake is 16 years old.

7. Answer: 6.7 degrees

- Starting temperature: -4.5° .
- 'Rose by 11.2' means add 11.2.
- Expression: $-4.5 + 11.2$.
- Result: 6.7° .

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8. Answer: Lia is 18 years old

- Let x = Lia's age.
 - 'Two thirds of Lia's age' = $(2/3)x$.
 - '6 years more' means + 6.
 - 'Marcus is 18' gives: $(2/3)x + 6 = 18$.
 - Subtract 6 from both sides: $(2/3)x = 12$.
 - Multiply both sides by the reciprocal $3/2$: $x = 12 \times (3/2) = 18$.
 - Lia is 18 years old.
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9. Answer: -15.9375 meters

- Current elevation: -12.75 m.
 - 'One fourth of her current depth' = $(1/4) \times (-12.75) = -3.1875$.
 - New elevation = $-12.75 + (-3.1875)$.
 - Note: descending further means adding a negative value.
 - New elevation = $-12.75 - 3.1875 = -15.9375$ m.
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10. Answer: $u = 85$ units

- Let u = number of units sold.
 - 'Three and one half times the units' = $3.5u$.
 - 'Plus a base pay of 125.50' means + 125.50.
 - Equation: $3.5u + 125.50 = 423$.
 - Subtract 125.50 from both sides: $3.5u = 423 - 125.50 = 297.50$.
 - Divide both sides by 3.5: $u = 297.50 \div 3.5 = 85$.
 - Carlos sold 85 units.
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