1) -2q-5= -11 2)3(8+k) = 33 3)4/6=x/9 4)6(y+3)=24 5)4k+8=26 6)8y=6+2y 7)3x-7=20 Pls Help!!!!!!!!!

1) -2q-5= -11 2)3(8+k) = 33 3)4/6=x/9 4)6(y+3)=24 5)4k+8=26 6)8y=6+2y 7)3x-7=20 Pls Help!!!!!!!!!

Understanding and Solving Basic Algebraic Equations

Algebra is a fundamental branch of mathematics that involves solving equations to find unknown values. Whether you're a student, a teacher, or someone brushing up on math skills, understanding how to solve algebraic equations is essential. In this guide, we will explore seven different equations, explain how to approach solving each, and provide step-by-step methods to find solutions. This comprehensive explanation aims to clarify concepts and help you master solving linear equations.

Equation 1: -2q - 5 = -11

Step-by-step Solution

This is a simple linear equation with one variable, q.

1. Identify the goal: Isolate q on one side of the equation.
2. Add 5 to both sides:
$$ -2q - 5 + 5 = -11 + 5 $$
$$ -2q = -6 $$
3. Divide both sides by -2:
$$ \frac{-2q}{-2} = \frac{-6}{-2} $$
$$ q = 3 $$

Final answer:
$$ \boxed{q = 3} $$

Equation 2: 3(8 + k) = 33

Step-by-step Solution

This involves distributing and then isolating the variable k.

1. Distribute 3 across the parentheses:
$$ 3 \times 8 + 3 \times k = 33 $$
$$ 24 + 3k = 33 $$
2. Subtract 24 from both sides:
$$ 24 + 3k - 24 = 33 - 24 $$
$$ 3k = 9 $$
3. Divide both sides by 3:
$$ \frac{3k}{3} = \frac{9}{3} $$
$$ k = 3 $$

Final answer:
$$ \boxed{k = 3} $$

Equation 3: $\frac{4}{6} = \frac{x}{9}$

Step-by-step Solution

This is a proportion involving fractions.

1. Simplify the fractions if possible:
$\frac{4}{6}$ simplifies to $\frac{2}{3}$.
So the equation becomes:
$$ \frac{2}{3} = \frac{x}{9} $$
2. Use cross-multiplication:
$$ 2 \times 9 = 3 \times x $$
$$ 18 = 3x $$
3. Divide both sides by 3:
$$ \frac{18}{3} = x $$
$$ x = 6 $$

Final answer:
$$ \boxed{x = 6} $$

Equation 4: 6(y + 3) = 24

Step-by-step Solution

This involves distribution and solving for y.

1. Distribute 6 across the parentheses:
$$ 6 \times y + 6 \times 3 = 24 $$
$$ 6y + 18 = 24 $$
2. Subtract 18 from both sides:
$$ 6y + 18 - 18 = 24 - 18 $$
$$ 6y = 6 $$
3. Divide both sides by 6:
$$ \frac{6y}{6} = \frac{6}{6} $$
$$ y = 1 $$

Final answer:
$$ \boxed{y = 1} $$

Equation 5: 4k + 8 = 26

Step-by-step Solution

This is a straightforward linear equation.

1. Subtract 8 from both sides:
$$ 4k + 8 - 8 = 26 - 8 $$
$$ 4k = 18 $$
2. Divide both sides by 4:
$$ \frac{4k}{4} = \frac{18}{4} $$
$$ k = \frac{18}{4} = \frac{9}{2} = 4.5 $$

Final answer:
$$ \boxed{k = \frac{9}{2}} \text{ or } 4.5 $$

Equation 6: 8y = 6 + 2y

Step-by-step Solution

Solve for y with variables on both sides.

1. Subtract 2y from both sides:
$$ 8y - 2y = 6 + 2y - 2y $$
$$ 6y = 6 $$
2. Divide both sides by 6:
$$ y = \frac{6}{6} = 1 $$

Final answer:
$$ \boxed{y = 1} $$

Equation 7: 3x - 7 = 20

Step-by-step Solution

Another simple linear equation.

1. Add 7 to both sides:
$$ 3x - 7 + 7 = 20 + 7 $$
$$ 3x = 27 $$
2. Divide both sides by 3:
$$ \frac{3x}{3} = \frac{27}{3} $$
$$ x = 9 $$

Final answer:
$$ \boxed{x = 9} $$

Summary of Solutions

Equation	Solution	Explanation
-2q - 5 = -11	q = 3	Added 5, then divided by -2
3(8 + k) = 33	k = 3	Distributed, then isolated k
4/6 = x/9	x = 6	Cross-multiplied and simplified
6(y + 3) = 24	y = 1	Distributed, then isolated y
4k + 8 = 26	k = 9/2 or 4.5	Subtracted, then divided
8y = 6 + 2y	y = 1	Subtracted 2y, then divided
3x - 7 = 20	x = 9	Added 7, then divided

Tips for Solving Algebraic Equations

- **Always do the same thing to both sides**: When adding, subtracting, multiplying, or dividing, do it to both sides to keep the equation balanced.
- **Distribute carefully**: When parentheses are involved, distribute each term properly to avoid mistakes.
- **Isolate the variable**: Aim to get the variable on one side of the equation with a coefficient of 1.
- **Simplify fractions**: Reduce fractions to their simplest form for easier calculations.
- **Check your solution**: Substitute your answer back into the original equation to verify correctness.

Common Mistakes to Avoid

- Forgetting to distribute the multiplication over parentheses.
- Failing to perform the same operation on both sides.
- Mixing up signs when moving terms across the equation.
- Dividing by zero (always check the coefficient isn't zero before dividing).
- Overlooking to simplify fractions or expressions.

Conclusion

Mastering the art of solving algebraic equations is crucial for progressing in mathematics. By understanding the basic principles—like isolating variables, distributing, and simplifying—you can confidently approach a wide variety of equations. Practice each step carefully, verify your solutions, and soon you'll find solving equations becomes second nature. Whether you're working through simple linear equations or more complex proportions, these foundational skills will serve you well in academic pursuits and everyday problem-solving.

If you encounter more complex equations or need further assistance, consider seeking additional resources or practicing with varied problems to strengthen your algebra skills. Remember, patience and consistent practice are key to becoming proficient in mathematics!

Frequently Asked Questions

How do I solve the equation -2q - 5 = -11?

Add 5 to both sides: -2q = -11 + 5, so -2q = -6. Divide both sides by -2: q = -6 / -2, which simplifies to q = 3.

What is the solution to 3(8 + k) = 33?

First, distribute 3: 24 + 3k = 33. Subtract 24 from both sides: 3k = 9. Divide both sides by 3: k = 3.

How do I solve the proportion 4/6 = x/9?

Cross-multiply: 4 9 = 6 x, so 36 = 6x. Divide both sides by 6: x = 36 / 6 = 6.

What is the value of y in 6(y + 3) = 24?

Distribute 6: 6y + 18 = 24. Subtract 18 from both sides: 6y = 6. Divide both sides by 6: y = 1.

How do I solve for k in 4k + 8 = 26?

Subtract 8 from both sides: 4k = 18. Divide both sides by 4: k = 18 / 4 = 4.5.

What is the value of y in 8y = 6 + 2y?

Subtract 2y from both sides: 8y - 2y = 6, so 6y = 6. Divide both sides by 6: y = 1.

How do I solve the equation 3x - 7 = 20?

Add 7 to both sides: 3x = 27. Divide both sides by 3: x = 9.

What are the steps to solve -2q - 5 = -11?

Add 5 to both sides: -2q = -6. Divide both sides by -2: q = 3.

How do I find k in the equation 3(8 + k) = 33?

Distribute: 24 + 3k = 33. Subtract 24: 3k = 9. Divide by 3: k = 3.

How can I solve the proportion 4/6 = x/9?

Cross-multiply: 4 9 = 6 x, so 36 = 6x. Divide both sides by 6: x = 6.

Additional Resources

Mathematical Equations and Their Solutions: An In-Depth Review and Analysis

Mathematics often appears as a complex web of equations and variables, intimidating at first glance but deeply logical upon closer inspection. Whether you're a student tackling algebra for the first time or a seasoned learner brushing up on foundational concepts, understanding how to approach and solve various equations is essential. In this comprehensive article, we'll explore a selection of algebraic equations, dissect their structures, and provide step-by-step solutions, illuminating the underlying principles that govern their resolution. This review-style analysis aims to deepen your comprehension and enhance your problem-solving skills.

Understanding the Role of Variables and Constants in Equations

Before delving into specific equations, it's crucial to grasp the fundamental components of algebraic expressions:

- Variables: Symbols (like x or y) representing unknown values.
- Constants: Fixed numbers that do not change.
- Operators: Symbols such as +, –, ×, and ÷ that indicate mathematical operations.

The primary goal in solving equations is to isolate the variable on one side, thereby uncovering its value. This process often involves inverse operations—adding to, subtracting from, multiplying, or dividing both sides of the equation—to systematically simplify the expression.

---

1. Solving the Linear Equation: -2q - 5 = -11

Structure and Significance

This is a straightforward linear equation involving a single variable, q. The equation combines a coefficient with the variable, a constant term, and an equality relation with a constant on the right.

Step-by-Step Solution

- Identify the goal: Isolate q on one side.
- Add 5 to both sides: To move the constant to the right.

$$
-2q - 5 + 5 = -11 + 5
$$
$$
-2q = -6
$$

- Divide both sides by -2: To solve for q.

$$
\frac{-2q}{-2} = \frac{-6}{-2}
$$
$$
q = 3
$$

Key Takeaways

- The solution, $q = 3$, demonstrates the importance of inverse operations.
- Always perform the same operation on both sides to maintain equality.
- Be mindful of the signs; dividing or multiplying by a negative number affects the inequality or equality direction.

---

2. Solving the Equation: $3(8 + k) = 33$

Structure and Significance

This equation involves a distribution—multiplication over a sum—and the variable k inside the parentheses. It exemplifies the distributive property and how it simplifies the process of solving for k.

Step-by-Step Solution

- Apply the distributive property: Multiply 3 with each term inside the parentheses.

$$
3 \times 8 + 3 \times k = 33
$$
$$
24 + 3k = 33
$$

- Subtract 24 from both sides: To isolate the term with k.

$$
24 + 3k - 24 = 33 - 24
$$
$$
3k = 9
$$

- Divide both sides by 3: To solve for k.

$$
\frac{3k}{3} = \frac{9}{3}
$$

$$
k = 3
$$

Key Takeaways

- Distributive property is fundamental when dealing with parentheses.
- Always simplify expressions before isolating variables.
- The solution $k = 3$ shows how combining like terms streamlines the process.

---

3. Solving the Proportion: $\frac{4}{6} = \frac{x}{9}$

Structure and Significance

This is a proportion involving two ratios, which can be solved through cross-multiplication. Proportions are common in ratio and scale problems.

Step-by-Step Solution

- Cross-multiplied: Multiply numerator of one ratio by denominator of the other.

$$
4 \times 9 = 6 \times x
$$
$$
36 = 6x
$$

- Divide both sides by 6: To isolate x.

$$
\frac{36}{6} = x
$$
$$
x = 6
$$

Key Takeaways

- Cross-multiplication simplifies solving proportions.
- Always check for common factors to reduce fractions before solving.
- The solution $x = 6$ provides a consistent ratio.

---

4. Solving for y in: $6(y + 3) = 24$

Structure and Significance

This equation involves a binomial inside a multiplication, showcasing the importance of distributing and isolating variables.

Step-by-Step Solution

- Distribute the 6:

$$
6 \times y + 6 \times 3 = 24
$$
$$
6y + 18 = 24
$$

- Subtract 18 from both sides:

$$
6y + 18 - 18 = 24 - 18
$$
$$
6y = 6
$$

- Divide both sides by 6:

$$
\frac{6y}{6} = \frac{6}{6}
$$
$$
y = 1
$$

Key Takeaways

- Distributive property simplifies multi-term expressions.
- Maintaining careful arithmetic prevents errors.
- The solution $y = 1$ confirms the variable's value.

---

5. Solving for k in: $4k + 8 = 26$

Structure and Significance

A classic linear equation, representing a fundamental building block in algebra.

Step-by-Step Solution

- Subtract 8 from both sides:

$$

$$
4k + 8 - 8 = 26 - 8
$$

$$
4k = 18
$$

- Divide both sides by 4:

$$
\frac{4k}{4} = \frac{18}{4}
$$

$$
k = \frac{18}{4} = \frac{9}{2} = 4.5
$$

Key Takeaways

- Always simplify fractions if possible.
- The solution $k = 4.5$ is a decimal, illustrating that solutions can be fractional.

---

6. Solving for y in: $8y = 6 + 2y$

Structure and Significance

This equation involves variables on both sides, requiring the collection of like terms to isolate the variable.

Step-by-Step Solution

- Subtract 2y from both sides:

$$
8y - 2y = 6 + 2y - 2y
$$

$$
6y = 6
$$

- Divide both sides by 6:

$$
y = \frac{6}{6} = 1
$$

Key Takeaways

- Combining like terms is vital in equations with variables on both sides.
- The solution $y = 1$ is consistent with previous results.

---

7. Solving for x in: $3x - 7 = 20$

Structure and Significance

A standard linear equation emphasizing the importance of inverse operations and step-by-step simplification.

Step-by-Step Solution

- Add 7 to both sides:

$$
3x - 7 + 7 = 20 + 7
$$

$$
3x = 27
$$

- Divide both sides by 3:

$$
x = \frac{27}{3} = 9
$$

Key Takeaways

- Maintaining balance in equations is crucial.
- The solution $x = 9$ completes the set of solutions explored.

Broader Implications and Applications

The Importance of Systematic Approach

The equations discussed exemplify core algebraic techniques: distributing, combining like terms, isolating variables, and cross-multiplied ratios. Mastery over these methods equips learners to tackle more complex problems in mathematics, physics, engineering, and economics.

Real-World Contexts

- Proportions are vital in scaling recipes, maps, and models.
- Linear equations model real-life phenomena like budgeting, distance calculations, and speed-time relationships.
- Variable isolation techniques are foundational for understanding functions, modeling trends, and solving systems of equations.

Common Challenges and Pitfalls

- Sign errors, especially when multiplying or dividing by negative numbers.
- Misapplication of distributive or inverse operations.
- Overlooking the need to simplify fractions or reduce expressions.

Tips for Effective Problem-Solving

- Write down each step clearly.
- Check the solution by substituting back into the original equation.
- Practice with varied problems to build confidence and flexibility.

Conclusion

This detailed examination of algebraic equations demonstrates that, regardless of complexity, solving for a variable follows a logical sequence rooted in fundamental principles. Whether dealing with simple linear equations, proportions, or multi-term expressions, understanding the properties of operations and maintaining procedural discipline are key. By mastering these techniques, learners develop

1 2q 5 11 2 3 8 K 33 3 4 6 X 9 4 6 Y 3 24 5 4k 8 26 6 8y 6 2y 7 3x 7 20 Pls Help

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