Lesson 2-1

Solving One-Step Equations

- Equivalent equations have the same solution.
- To solve an equation means to find all values of the variable that make the equation a true statement.
- **Addition Property of Equality** states that if an equation is true and the same number is added to each side, the resulting equation is true.
- **Subtraction Property of Equality** states that if an equation is true and the same numbers is subtracted from each side, the resulting equation is also true.

Key Concept: You can add or subtract any number from an equation – AS LONG AS YOU DO THE SAME THING TO BOTH SIDES of the equation.

Examples: (Horizontal method)

A. $h - 12 = -27$

$h - 12 + 12 = -27 + 12$ (Do the opposite of subtracting 12 from each side)

$h = -15$ (Simplify – work out each side.)

B. $k + 63 = 92$

$K + 63 - 63 = 92 - 63$ (Do the opposite of adding 63 to each side.)

$K = 29$ (Simplify)

C. $c + 102 = 36$

$C + 102 - 102 = 36 - 102$

$C =$

D. $y + \frac{4}{5} = \frac{2}{3}$

$y + \frac{4}{5} - \frac{4}{5} = \frac{2}{3} - \frac{4}{5}$

Get a common denominator!

$y = \frac{10}{15} - \frac{12}{15}$

$y = -\frac{2}{15}$

Vertical method:

A) $h - 12 = -27$

$+12 \quad +12$

$h = -15$

B) $K + 63 = 92$

$-63 \quad -63$

$K = 29$

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Solving One-Step Equations

TRY THESE ON YOUR OWN:

PRACTICE:

1. $a - 24 = 16$

2. $c + 22 = -39$

3. $129 + k = {}^{-}42$

4. $\frac{2}{3} + y = \frac{5}{6}$

5. Fourteen more than a number is equal to twenty-seven. Find this number.

6. Twelve less than a number is equal to negative twenty-five. Find the number.

Solving One-Step Equations

- **Multiplication Property of Equality** states that if an equation is true and the each side is multiplied by the same number, the resulting equation is true.
- **Division Property of Equality** states that if an equation is true and the each side is divided by the same number, the resulting equation is true.

Key Concept: You can do anything to an equation– AS LONG AS YOU DO THE SAME THING TO BOTH SIDES of the equation.

Examples:

E. $\frac{s}{12} = \frac{3}{4}$

The variable is being divided, so multiply by that same number to get a coefficient of 1.

$12 \cdot \frac{s}{12} = 12 \cdot \frac{3}{4}$

$s = 9$

F. $\frac{r}{10} = 15$

$10 \cdot \frac{r}{10} = 10 \cdot 15$

$r = 150$

G. $\left(-3\frac{3}{8}\right)k = 1\frac{4}{5}$

Change mixed number to improper fraction and multiply by the reciprocal.

$-\frac{27}{8}K = \frac{9}{5}$

$-\frac{8}{27} \cdot -\frac{27}{8}K = \frac{9}{5} \cdot -\frac{8}{27_3}$

$K = -\frac{8}{15}$

H. $\left(2\frac{3}{4}\right)g = 1\frac{2}{3}$

$\frac{11}{4}g = \frac{5}{3}$

$\frac{4}{11} \cdot \frac{11}{4}g = \frac{5}{3} \cdot \frac{4}{11}$

$g = \frac{20}{33}$

I. $-75 = -15b$

The variable is being multiplied by a number, so divide by that number to get a coefficient of 1..

(Symmetric Property)

$\frac{-15b}{-15} = \frac{-75}{-15}$

$b = 5$

J. $-5x = 20$

$\frac{-5x}{-5} = \frac{20}{-5}$

$x = -4$

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DO THESE ON YOUR OWN.

Solving One-Step Equations

PRACTICE:

7. $\frac{a}{18} = \frac{2}{3}$

8. $32 = -14c$

9. $3w = 198$

10. $\left(4\frac{1}{3}\right)m = 5\frac{3}{7}$

11. $11w = 143$

12. $-8x = 96$

13. Negative 14 times a number equals 224. Find the number.

14. One and a half times a number equals negative six. Find the number.

Extra Practice:

1. $27 + n = 46$

2. $-5 + a = 21$

3. $67 = w - 65$

4. $q - 11 = -9$

5. $-7y = 28$

6. $11 = 2.2t$

7. $35 = \frac{j}{5}$

8. $\frac{q}{-9} = -9$

9. $\frac{3}{5}m = -15$

10. $36 = \frac{4}{9}d$

11. According to one count, the letter *e* makes up one-eighth of a typical document written in English. A document contains 2800 letters. About how many letters in the document are *not* e?