

Name _____

Date _____

Mr. Tallman

Math 7-8A

Do Now

Fill in the blank with a number to make each equation true.

1) 11 + 3 = 14

2) 26 - 6 = 20

3) 10 - 14 = -4

Fill in the blank with a number to make each equation true.

4) 8 · 6 = 48

5) 30 ÷ -6 = -5

6) 3 · -9 = -27

Lesson #9 - Solving One-Step Equations

Equations are mathematical sentences in which two **expressions** are equal.

Algebraic Equations are equations that involve both numbers and variables.

Examples of **Algebraic Equations**:

$$x + 6 = 17$$

$$2x = 13$$

$$\frac{1}{2}x - 6 = 12$$

We use different mathematical properties in order to solve an equation for a given variable.

Addition Property of Equality: If $A = B$, then $A + C = B + C$

Example 1) Solve and check: $x - 5 = 13$

$$\begin{array}{r} x - 5 = 13 \\ +5 \quad +5 \\ \hline x = 18 \end{array}$$

Check

$$\begin{array}{l} x - 5 = 13 \\ 18 - 5 = 13 \\ 13 = 13 \checkmark \end{array}$$

Subtraction Property of Equality: If $A = B$, then $A - C = B - C$

Example 2: Solve and Check: $x + 10 = 26$

$$\begin{array}{r} x + 10 = 26 \\ -10 \quad -10 \\ \hline x = 16 \end{array}$$

Check

$$\begin{array}{l} x + 10 = 26 \\ 16 + 10 = 26 \\ 26 = 26 \checkmark \end{array}$$

Division Property of Equality: If $A = B$, then $\frac{A}{C} = \frac{B}{C}$

Example 3) Solve and Check: $8y = 48$

$$\begin{array}{r} 8y = 48 \\ -8 \quad -8 \\ \hline y = 6 \end{array}$$

Check

$$\begin{array}{l} 8y = 48 \\ 8(6) = 48 \\ 48 = 48 \checkmark \end{array}$$

Multiplication Property of Equality: If $A = B$, then $A \times C = B \times C$

Example 4) Solve and Check: $\frac{x}{3} = 17$

$$\begin{array}{r} 3 \left(\frac{x}{3} \right) = (17) 3 \\ \hline x = 51 \end{array}$$

Check

$$\begin{array}{l} \frac{x}{3} = 17 \\ \frac{51}{3} = 17 \\ 17 = 17 \checkmark \end{array}$$

Example 5)

Part A: Sean solved the equation $6x = 72$. What mathematical property did Sean use to find the solution?

Division Property of Equality

Part B: Solve the equation from Part A.

$$\begin{array}{r} 6x = 72 \\ \hline x = 12 \end{array}$$

Now, You Try!

Directions: Solve and Check each equation. Write the mathematical property used to solve.

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1) $8 = -4 + x$ $+4 \quad +4$ $x = 12$</p> <p>$8 = -4 + x$ $8 = -4 + 12$ $8 = 8 \checkmark$</p> | <p>2) $-6(-9) = \left(\frac{x}{-6}\right) \cdot -6$ $x = 54$</p> <p>$-9 = \frac{x}{-6}$ $-9 = \frac{54}{-6}$ $-9 = -9 \checkmark$</p> |
| <p>3) $-1 = x - 15$ $+15 \quad +15$ $x = 14$</p> <p>$-1 = x - 15$ $-1 = 14 - 15$ $-1 = -1 \checkmark$</p> | <p>4) $-8x = 56$ $x = -7$</p> <p>$-8x = 56$ $-8(-7) = 56$ $56 = 56 \checkmark$</p> |
| <p>5) $\left(\frac{x}{-7}\right) = (7) \cdot -1$ $x = -49$</p> <p>$\frac{x}{-7} = 7$ $\frac{-49}{-7} = 7$ $7 = 7 \checkmark$</p> | <p>6) $-11 + x = -15$ $+11 \quad +11$ $x = -4$</p> <p>$-11 + x = -15$ $-11 + (-4) = -15$ $-15 = -15 \checkmark$</p> |
| <p>7) $\frac{-150}{15} = \frac{15x}{15}$ $x = -10$</p> <p>$-150 = 15x$ $-150 = 15(-10)$ $-150 = -150 \checkmark$</p> | <p>8) $20 = x + 10$ $-10 \quad -10$ $x = 10$</p> <p>$20 = x + 10$ $20 = 10 + 10$ $20 = 20 \checkmark$</p> |

9) Which mathematical property would be used to solve the equation $\frac{x}{8} = -12$ Multiplication Prop.

10) Allison said that -3 is the solution to the equation $3x = 9$. Is Allison correct? No. Justify your answer.

$x = 3$

11) Tom owed his friend \$15. He paid his friend back some money. After he paid his friend back some money, he only owed his friend \$9.

Part A) Write an equation that models this situation. Be sure to include a let statement.

Let x = amount of money he paid back.

$$-15 + x = -9$$

~~$-15 + x = -9$~~
 $-15 + x = -9$
 $+15 \quad +15$

$x = \$4$

Part B) Solve your equation from part A to determine how much money Tom paid back.

12) The temperature in the morning at MAMS was 70°F . The temperature increased by a certain amount and at the end of 9th period, the temperature was 81° . Set up and solve an equation to determine how much the temperature increased. Be sure to write a let statement.

Let x = the amount of increase.

$$70 + x = 81$$

~~$70 + x = 81$~~
 $-70 \quad -70$
 $x = 11^{\circ}$

13) Josh saved \$10 dollars a week for a certain number of weeks in order to pay for a new video game. The video game costs \$60.

Part A) Write an equation that models this situation. Be sure to include a let statement.

Let x = # of weeks $10x = 60$

Part B) Solve your equation from part A to determine how many weeks Josh needs to save money to pay for the video game.

~~$10x = 60$~~
 $\frac{10x}{10} = \frac{60}{10}$ $x = 6$

14) Jordan wants to sign up for a certain music streaming service. That music streaming service costs \$9 per month for unlimited streaming without ads. After a certain number of months, Jordan paid \$81 and then canceled his subscription. Write and solve an equation to determine for how many months his subscription was active. Be sure to include a let statement.

Let x = # of months

~~$9x = 81$~~
 $\frac{9x}{9} = \frac{81}{9}$

$x = 9$ months