

**Objective:** To be able to solve equations and provide reasoning for each step.

**Directions:** Solve each equation and justify your steps using the properties of equality.

**Example:**  $\frac{8x}{3} + 12 = 28$

1.  $\frac{8x}{3} + 12 = 28$

1. *Given*

2.  $\frac{8x}{3} = 16$

2. *Subtraction prop. of equality*

3.  $8x = 48$

3. *Multiplication prop. of equality*

4.  $x = 6$

4. *Division prop. of equality*

1.  $7x + 4 = 46$

$-4 \quad -4$

$\frac{7x}{7} = \frac{42}{7}$

Subt. POE

$x = 6$

Div. POE

2.  $3 + 2x = -11$

$-3 \quad -3$

$\frac{2x}{2} = \frac{-14}{2}$

Subt. POE

$x = -7$

Div. POE

3.  $-6 + 8x = 16$

$+6 \quad +6$

$$\frac{8x}{8} = \frac{22}{8} \quad \text{Add. POE}$$

$$\boxed{x = \frac{11}{4}} \quad \text{Div POE}$$

4.  $27 = 9 - 5x$

$-9 \quad -9$

$$\frac{18}{-5} = \frac{-5x}{-5} \quad \text{Subt. POE}$$

$$\boxed{x = -\frac{18}{5}} \quad \text{Div POE}$$

5.  $\frac{x}{3} - 16 = 3$

$+16 \quad +16$

$$(3) \frac{x}{3} = 19(3) \quad \text{Add POE}$$

$$\boxed{x = 57} \quad \text{Mult POE}$$

6.  $-14 + \frac{x}{4} = 6$

$+14 \quad +14$

$$(4) \frac{x}{4} = 20(4) \quad \text{Add POE}$$

$$\boxed{x = 80} \quad \text{Mult POE}$$

7.  $\frac{2x}{5} = 15$

$2x = 75 \quad \text{Mult POE}$

$$\boxed{x = \frac{75}{2}} = 37.5 \quad \text{Div POE}$$

8.  $12 = \frac{3x}{7} + 6$

$-6 \quad -6$

$$6 = \frac{3x}{7} \quad \text{Subt. POE}$$

$42 = 3x \quad \text{Mult POE}$

$$\boxed{x = 14} \quad \text{Div POE}$$

9.  $13 = \frac{x+4}{2}$

$26 = x+4$

Mult. POE

$$\boxed{22 = x}$$

Subt. POE

10.  $\frac{x-9}{-2} = 12$

$x-9 = -24$

Mult. POE

$$\boxed{x = -15}$$

Add POE

11.  $\frac{5x-1}{4} = 9$

$$5x-1 = 36 \quad \text{Mult poe}$$

$$5x = 37 \quad \text{Add poe}$$

$$\boxed{x = 37/5} \quad \text{Div poe}$$

12.  $4x + 8 - 7x = 20$

$$-3x = 12$$

$$\boxed{x = -4}$$

13.  $17 = -2x + 8 + 11x$

$$9 = 9x$$

$$\boxed{x = 1}$$

14.  $2x - 9 = 7x - 24$

$$15 = 5x$$

$$\boxed{x = 3}$$

15.  $6x - 11 = -8x + 24$

$$14x = 35$$

$$\boxed{x = 35/14}$$

16.  $-3x + 2 = -6x - 22$

$$3x = -24$$

$$\boxed{x = -8}$$

17.  $5(x - 4) = 16$

$$5x - 20 = 16$$

$$5x = 36$$

$$\boxed{x = 36/5}$$

18.  $18 = 2(x + 3)$

$$18 = 2x + 6$$

$$12 = 2x$$

$$\boxed{x = 6}$$

19.  $6(x - 9) = 4(2x + 5)$

$$6x - 54 = 8x + 20 \quad \text{Dist. Prop}$$

$$-74 = 2x \quad \text{Subt. POE}$$

$$\boxed{x = -37} \quad \text{Div POE}$$

20.  $-2(x - 6) = 8(x + 6)$

$$-2x + 12 = 8x + 48$$

$$-36 = 10x$$

$$x = -36/10 = \boxed{-18/5}$$

21.  $3 + \frac{8x-5}{4} = 10$

$$\frac{8x-5}{4} = 7 \quad \text{Subt. POE}$$

$$8x-5 = 28 \quad \text{Mult POE}$$

$$8x = 33 \quad \text{Add POE}$$

$$\boxed{x = 33/8} \quad \text{Div POE}$$

22.  $6 - 4(x - 3) = 2x$

$$6 - 4x + 12 = 2x$$

$$18 = 6x$$

$$\boxed{x = 3}$$

23.  $8(2x - 5) = -2(x + 1) + 16$

$$16x - 40 = -2x - 2 + 16$$

$$18x = 54$$

$$\boxed{x = 3}$$

24.  $-7 + 2x + 1 = -8x - 14 + 6x$

$$2x - 6 = -2x - 14$$

$$4x = -8$$

$$\boxed{x = -2}$$