

Solving Multi-step Equations Notes

Goal: isolate the variable.

Steps:

- Undo using inverse operations.
- Undo addition/subtraction first, then multiplication/division unless parentheses are involved.
- If parentheses are present, consider the distributive property.
- If fractions are involved, consider multiplying by the reciprocal to "clear the fraction" rather than distributing.

Solve.

$$1) 2x + \cancel{16} = -26$$

$$+ \cancel{-16} + -16$$

$$\frac{2x}{2} = \frac{-42}{2}$$

$$x = -21$$

Solve.

$$2) \frac{1}{2}x - 5 = 10$$

$$+5 \quad +5$$

$$\cancel{\frac{2}{2}} \cdot \cancel{\frac{1}{2}}x = 15 \cdot \frac{2}{1}$$

$$x = \frac{15}{1} \cdot \frac{2}{1} = 30$$

Solve.

$$3) 2x - 5(x - 9) = 27$$

$$2x + -5(x + -9) = 27$$

$$2x + -5x + 45 = 27$$

$$\underbrace{2x + -5x}_{-3x} + 45 = 27$$

$$+ -45 \quad + -45$$

$$-3x = -18$$

$$x = 6$$

Solve.

$$4) -24 = \frac{4}{3} (x - 7)$$

$$\frac{\cancel{3}}{\cancel{4}} \cdot \frac{-24^{\cancel{6}}}{1} = \frac{\cancel{3}}{\cancel{4}} \cdot \frac{\cancel{4}}{\cancel{3}} (x - 7)$$

$$-18 = x - 7$$

$$+7 \quad \quad +7$$

$$-11 = x$$

Solve.

$$5) -6/5 (x + 3) = 66$$

$$\frac{-\cancel{6}}{\cancel{5}} \cdot \frac{-\cancel{5}}{\cancel{6}} (x + 3) = \frac{-\cancel{5}}{\cancel{6}} \cdot \frac{\cancel{66}}{1}$$

$$x + 3 = -55$$

$$+ -3 \quad + -3$$

$$x = -58$$