

Section 2-3: Solving Multi-Step Equations

There's nothing "new" in this section, just putting together other things we've learned like combining like terms, distribution, and solving one- or two-step equations.

$$8x + 5 - 6x = 25$$

Example 1: Solve.

a. $12(3 - x) = 60$

$$36 - 12x = 60$$

$$-12x = 24$$

$$x = -2$$

b. $-2y + 5 + 5y = 14$

$$3y + 5 = 14$$

$$3y = 9$$

$$y = 3$$

When solving an equation with fractions, you again have two choices:

$$\frac{2b}{5} + \frac{3b}{4} = \frac{3}{10}$$

Find a common denominator

$$\frac{2b}{5} + \frac{3b}{4} = \frac{3}{10}$$

$$\frac{8b}{20} + \frac{15b}{20} = \frac{3}{10}$$

$$\frac{23b}{20} = \frac{3}{10}$$

$$23b = 6$$

$$b = \frac{6}{23}$$

Clear by multiplying by LCD

$$20 \cdot \left(\frac{2b}{5} + \frac{3b}{4} \right) = \left(\frac{3}{10} \right) 20$$

$$20 \cdot \frac{2b}{5} + 20 \cdot \frac{3b}{4} = 20 \cdot \frac{3}{10}$$

$$8b + 15b = 6$$

$$23b = 6$$

$$b = \frac{6}{23}$$

Example 2: Solve.

a. $\frac{3x}{4} - \frac{x}{8} = 5$

$$16 \cdot \left(\frac{3x}{4} - \frac{x}{8} \right) = 16 \cdot (5)$$

$$\frac{16}{1} \cdot \frac{3x}{4} - \frac{16}{1} \cdot \frac{x}{8} = 80$$

$$12x - 2x = 80$$

$$10x = 80$$

$$x = 8$$

b. $\frac{1}{9} = \frac{5}{6} - \frac{m}{3}$

$$\frac{5}{6} - \frac{m}{3} = \frac{1}{9}$$

$$18 \cdot \left(\frac{5}{6} - \frac{m}{3} \right) = 18 \cdot \left(\frac{1}{9} \right)$$

$$15 - 6m = 2$$

$$-6m = -13$$

$$m = \frac{13}{6}$$