

## 1.3 Solving Linear Equations

An EQUATION...

...a statement in which two expressions are equal.

A LINEAR EQUATION (in one variable)...

...an equation that can be written  $ax = b$  where 'a' and 'b' are constants and 'a'  $\neq 0$ .

A SOLUTION...

...a number that makes the equation true when substituted for the variable.

EQUIVALENT...

... two equations that have the same solutions  
( $x - 4 = 1$  and  $x + 3 = 8$ )

## Transformations That Produce Equivalent Equations

Add. Prop. of Equal.

Add same number to both sides:

If  $a = b$ , then  $a + c = b + c$

Sub. Prop. of Equal.

Sub. same number from both sides:

If  $a = b$ , then  $a - c = b - c$

Mult. Prop. of Equal.

Mult. both sides by same nonzero number:

If  $a = b$  and  $c \neq 0$ , then  $ac = bc$

Div. Prop. of Equal.

Div. both sides by same nonzero number:

If  $a = b$  and  $c \neq 0$ , then  $a \div c = b \div c$

Solving Various Equations

$$2/9X + 8 = 16$$

$$\frac{2}{9}x = \frac{8}{9} \quad (8-8)$$

$$x = 36$$

$$12N - 3 = 4N + 21$$

$$12N = 4N + 24$$

$$-4N = -4N$$

$$8N = 24$$

$$N = 3$$

$$5(X - 2) = -4(2X + 7) + X$$

$$5x - 10 = -8x - 28 + x$$

$$5x - 10 = -7x - 28$$

$$5x + 18 = -7x$$

$$\frac{18}{-12} = \frac{-7x}{-12} \quad x = \frac{-18}{-12} = \frac{3}{2}$$

$$2/3X + 1/5 = 2X - 3/10$$

$$\frac{2}{3}x + \frac{1}{5} = 2x - \frac{3}{10}$$

$$\frac{2}{3}x + \frac{1}{5} + \frac{3}{10} = 2x - \frac{3}{10} + \frac{3}{10}$$

$$\frac{2}{3}x + \frac{1}{5} + \frac{3}{10} = 2x$$

$$\frac{2}{3}x + \frac{1}{5} + \frac{3}{10} - \frac{2}{3}x = 2x - \frac{2}{3}x$$

$$\frac{1}{5} + \frac{3}{10} = \frac{4}{3}x$$

$$\frac{2}{10} + \frac{3}{10} = \frac{4}{3}x$$

$$\frac{5}{10} = \frac{4}{3}x$$

$$\frac{1}{2} = \frac{4}{3}x$$

$$x = \frac{3}{8}$$

## Linear Equations in Real Life

A car salesperson's base salary is \$21,000. She earns a 5% commission on sales. How much must she sell to earn \$65,000 total?

$$21000 + .05N = 65,000$$

$$N = \$880,000$$

**Assignment:**

**p. 22**

**# 24-42 even,  
44, 46**

**Quiz (1.1-1.3) Tomorrow**