Linear Equations

Wednesday 18 2010

Note Title 8/18/2010

$ax + b = 0 \quad a \neq 0$

Examples

$2x + 3 = 0$ a linear equation

$-x + 500 = 0$ Yes

$0.1x - 7.5 = 0$ Yes

$35x = 0$ Yes $b = 0$

$2x^2 + 5 = 0$ NO Degree = 2

Quadratic

$0.1x^3 + 3x + 6 = 0$ No

degree = 3

Cubic

Example 1

$3x + 4 = 16$

Subtract 4 from both sides:

$3x + 4 - 4 = 16 - 4$

$\frac{3x}{3} = \frac{12}{3}$ divide both sides by 3

$x = 4$

Check:

$3x + 4 \stackrel{?}{=} 16$

$3(4) + 4 \stackrel{?}{=} 16$

$12 + 4 \stackrel{?}{=} 16$

$16 = 16$ ✓

The solution set is $\{4\}$.

Example 2

$5x - (7x - 4) - 2 = 5 - (3x + 2)$

Eliminate the parenthesis

$5x - 7x + 4 - 2 = 5 - 3x - 2$

$$-2x + 2 = 3 - 3x$$

$$+3x \qquad\qquad +3x$$

$$x + 2 = 3$$

$$-2 \qquad\qquad -2$$

$$x = 1$$

The solution set is $\{1\}$.

Example 3

$$\frac{1}{2}p - 5 = \frac{3}{4}p$$

multiply both sides by the least common denominator LCD = 4

$$4\left(\frac{1}{2}p\right) - 4(5) = 4\left(\frac{3}{4}p\right)$$

$$2p - 20 = 3p$$

$-2p \qquad -2p$

$$-20 = p$$

solution set is $\{-20\}$.

Example

$$5x + 10 = 25 + 2x$$

$$5x + 10 - 10 = 25 + 2x - 10$$

$$5x = 15 + 2x$$

$$5x - 2x = 15 + 2x - 2x$$

$$3x = 15$$

$$\frac{3x}{3} = \frac{15}{3}$$

$$\boxed{x = 5}$$

Example

$$5(2y-1) = 2(4y-3)$$

$$10y - 5 = 8y - 6$$

$$10y - 5 + 5 = 8y - 6 + 5$$

$$10y = 8y - 1$$

$$10y - 8y = 8y - 1 - 8y$$

$$\frac{2y}{2} = \frac{-1}{2}$$

$$\boxed{y = -\frac{1}{2}}$$