**Objective:I can solve multi- step equations with variables on both sides.**

## VARIABLE TERMS ON BOTH SIDES

To solve when you have variables on both sides, eliminate one of these terms by adding the opposite of it to both sides.

**Examples**

*Add -2x to both sides first*

Make sure that you only combine LIKE terms. Line them up accordingly.

1. $5x + 6 = 2x + 15$
$-2x \quad -2x$
$3x + 6 = 15$
$-6 \quad -6$
$3x = 9$
$\frac{3x}{3} = \frac{9}{3}$
$\boxed{x = 3}$

2. $7x + 4 = 20 + 3x$
$-3x \quad -3x$
$4x + 4 = 20$
$-4 \quad -4$
$\frac{4x}{4} = \frac{24}{4}$
$\boxed{x = 6}$

3. $2x + 15 = -5x$
$-2x \quad -2x$
$15 = -7x$
$\frac{15}{-7} = \frac{-7x}{-7}$
$-\frac{15}{7} = x$
$\boxed{x = -\frac{15}{7} \text{ or } -2\frac{1}{7}}$

**Practice.**

1. $3 + 4v = 9v + 13$
$-4v \quad -4v$
$3 = 5v + 13$
$-13 \quad -13$
$\frac{-10}{5} = \frac{5v}{5}$
$\boxed{v = -2}$

2. $2c + 50 = 8c$
$-2c \quad -2c$
$\frac{-50}{6} = \frac{6c}{6}$
$-25 = c$
$\frac{-25}{3}$
$\boxed{c = -\frac{25}{3} \text{ or } -8\frac{1}{3}}$

3. $-7m + 20 = 5m + 4$
$+7m \quad +7m$
$-20 = 12m + 4$
$-4 \quad -4$
$\frac{-24}{12} = \frac{12m}{12}$
$\boxed{m = -2}$

4. $27 + 11x = x$
$+11x \quad +11x$
$\frac{27}{12} = \frac{12x}{12}$
$x = \frac{27 \div 3}{12 \div 3} = \boxed{\frac{9}{4} \text{ or } 2\frac{1}{4}}$

5. $21z + 6 = 17z + 26$
$-21z \quad -21z$
$6 = -4z + 26$
$-26 \quad -26$
$\frac{32}{-4} = \frac{-4z}{-4}$
$\boxed{z = -8}$

6. $11x = 8x + 6$
$-8x \quad -8x$
$\frac{3x}{3} = \frac{-6}{3}$
$\boxed{x = -2}$

Write an equation and solve. Let "x" = the number.

7. Twenty decreased by 2 times a number is the same as 10 less than 3 times the number. Find the number.

$10 - 3x$

Equation: $\underline{20 + -2x = 3x + 10}$

Solve:
$20 + -2x = 3x + 10$
$+2x \quad +2x$
$20 = 5x + -10$
$+10 \quad +10$
$\frac{30}{5} = \frac{5x}{5}$
$\boxed{x = 6}$