

## 5.7 Solving Polynomial Equations by Factoring

A quadratic or second degree equation (highest power of  $x$  is 2) is one that may be written in the form  $ax^2 + bx + c = 0$ , where  $a \neq 0$ . Example:  $x^2 - 2x + 4 = 0$

Get 0 on one side.

1.  $x^2 - 5x = 8$

2.  $5x^2 = 3x$

3.  $x^2 = 25$

We use the **Principle of Zero Products** to solve a quadratic equation:

**$AB=0$  is true if and only if  $A=0$  or  $B=0$  or both.** A product is 0 if and only if at least one factor is 0.

Use the **Principle of Zero Products** to solve these equations:

1.  $x(x + 3) = 0$

2.  $(x - 4)(3x + 1) = 0$

3.  $x(x + 1)(5x - 2) = 0$

To Solve a Quadratic Equation:

- 1) Get 0 on one side of the equation. **Make term of highest degree positive.**
- 2) Factor the other side of the equation.
- 3) Set each factor equal to 0 and solve for the variable.

SOLVE:

1.  $x^2 - 25 = 0$

2.  $x^2 - x - 12 = 0$

3.  $x^3 + 14x^2 + 24x = 0$

$$4. y^2 - 9y = 0$$

$$5. w^2 - 16 = 0$$

$$6. x^3 - 3x^2 - 10x = 0$$

$$7. x^2 - x = 20$$

$$8. -24 = 6x - 3x^2$$

$$9. -8x^2 = 5x$$

$$10. 2x^2 - 6x = x$$

$$11. x^4 + 25 = 26x^2$$

$$12. 6x = 3x^2$$

$$13. 2x^3 - 4x^2 = 30x$$

$$14. 9 = 25y^2$$

$$15. 3x^2 - 13x = 10$$