

## Chapter 13: Quadratic Relations and Functions

### Solving Quadratic Equations

The equation  $x^2 - 3x - 10 = 0$  is a second degree equation because the greatest exponent of  $x$  is 2.

A polynomial equation that is second degree is also called a quadratic equation.

Standard form of a quadratic equation is

$ax^2 + bx + c = 0$ , where  $a, b,$  and  $c$  are real numbers and  $a \neq 0$ .

When solving a quadratic equation, we begin by writing the equation in standard form (get it set = 0) and use factoring to isolate the variable.

Ex)  $x^2 + 2 = 3x$      Set each factor = 0, solve these smaller equations and then check your answers in the original.

$$\begin{array}{l} x^2 - 3x + 2 = 0 \\ (x - 2)(x - 1) = 0 \\ \begin{array}{l|l} x - 2 = 0 & x - 1 = 0 \\ +2 \quad +2 & +1 \quad +1 \\ \hline x = 2 & x = 1 \end{array} \end{array}$$

Check

$$\begin{array}{ll} x^2 + 2 = 3x & x^2 + 2 = 3x \\ 2^2 + 2 = 3(2) & 1^2 + 2 = 3(1) \\ 4 + 2 = 6 \checkmark & 1 + 2 = 3 \checkmark \end{array}$$

Remember that you can only combine like terms. Like terms have the same variable with the same exponent.

Solve for  $x$ :  $x(x-4) = 5$

$$x(x-4) = 5$$

$$x^2 - 4x = 5$$

$-5 \quad -5$

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$$x^2 - 4x - 5 = 0$$

$$(x-5)(x+1) = 0$$

$$\begin{array}{l|l} x-5=0 & x+1=0 \\ +5 & -1 \end{array}$$

$x = 5$	$x = -1$
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Check:

$$x(x-4) = 5$$

$$5(5-4) = 5$$

$$5 \cdot 1 = 5 \checkmark$$

$$x(x-4) = 5$$

$$-1(-1-4) = 5$$

$$1 + 4 = 5 \checkmark$$

hwk: p507 (3-37) odd