

3/5 Algebra 1 - Downing

7.6 B Solving Quadratics by Factoring

Review: Factor

$$6x^2 + 23x + 7$$

$$(6x^2 + 2x)(7x + 7)$$

$$2x(3x+1) + 7(3x+1)$$

$$(2x+7)(3x+1)$$

$$6 \cdot 7 = 42$$

$$1 \quad 42$$

$$2 \quad 21 = 23$$

$$3 \quad 14$$

$$6 \quad 7$$

Ex) $\frac{6x^2}{2} - \frac{38x}{2} + \frac{40}{2}$

$$a \cdot c = 60$$

$$-1 \quad 60$$

$$-2 \quad 30$$

$$-3 \quad 20$$

$$-4 \quad 15$$

$$-5 \quad 12$$

$$-6 \quad 10$$

$$2(3x^2 - 19x + 20)$$

$$\left(\frac{3x^2}{x} - \frac{4x}{x}\right) \left(\frac{15x}{-5} + \frac{20}{-5}\right)$$

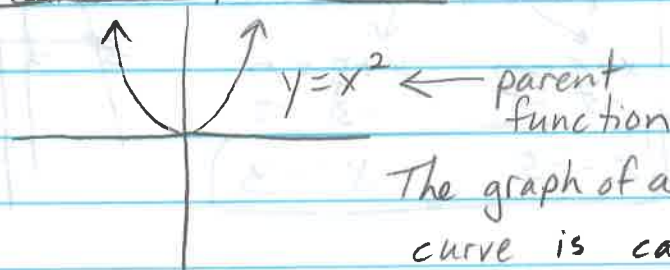
$$x(3x-4) - 5(3x-4)$$

$$2(x-5)(3x-4)$$

Quadratic Function

→ standard form: $f(x) = ax^2 + bx + c$

or $y = ax^2 + bx + c$

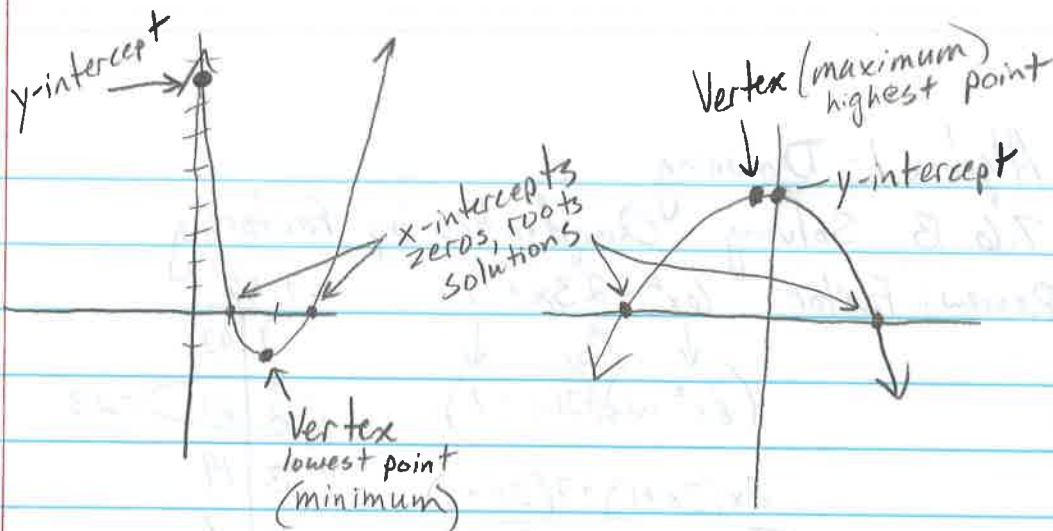


The graph of a quadratic is a curve. This curve is called a parabola.

Vertex - highest or lowest point on the parabola (maximum or minimum)

X-intercepts - where graph crosses the x-axis (also called the solutions, roots or zeros)

y-intercept - where graph crosses the y-axis



Solving Quadratics by Factoring

Steps

- 1) Move all terms to one side
Get equation set to zero
- 2) Factor the polynomial

Example: Solve

$$-2x^2 - 16x = 30$$

$$\frac{-2x^2}{-2} - \frac{16x}{-2} - \frac{30}{-2} = 0$$

$$-2(x^2 + 8x + 15) = 0$$

$$\left(\frac{x^2}{x} + \frac{3x}{x} + \frac{5x}{5} + \frac{15}{5}\right) = 0$$

$$x(x+3) + 5(x+3) = 0$$

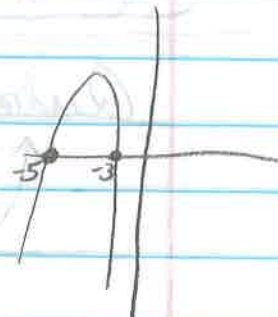
$$-2(x+5)(x+3) = 0$$

$$\begin{array}{l} x+5=0 \\ -5 \quad -5 \end{array} \quad \begin{array}{l} x+3=0 \\ -3 \quad -3 \end{array}$$

$$x = -5 \quad x = -3$$

$$1 \cdot 15 = 15$$

$$\begin{array}{r} 1 \ 15 \\ 3 \ 5 \\ \hline \end{array} = 8$$



- 3) Set each factor equal to zero and solve

Ex) Solve: $3x^2 + 8 = 14x$

$$3x^2 - 14x + 8 = 0$$

$$\left(\frac{3x^2}{x} - \frac{2x}{x}\right) - 4\left(\frac{12x}{4} + \frac{8}{4}\right) = 0$$

$$x(3x-2) - 4(3x-2) = 0$$

$$(x-4)(3x-2) = 0$$

$$\begin{array}{r} 3 \cdot 8 = 24 \\ -1 \ 24 \\ \hline -2 \ 12 \\ -3 \ 8 \\ \hline -4 \ 6 \end{array}$$

$$\begin{array}{l} x-4=0 \\ +4 \quad +4 \\ \hline x=4 \end{array}$$

$$\begin{array}{l} 3x-2=0 \\ +2 \quad +2 \\ \hline 3x=2 \\ \frac{3x}{3} = \frac{2}{3} \\ x = \frac{2}{3} \end{array}$$

HW-Worksheet

#1, 5, 9, 10, 17,