

# Quadratics Study Guide

To be successful on your test should know...

## **a) How to find the Axis of Symmetry**

Example: Find the axis of symmetry for the equation  $y = 3x^2 + 9x - 5$

## **b) How to use the Axis of Symmetry to find the vertex**

Example: Using the axis of symmetry from part A, what is the vertex of the equation?

## **c) How to know if the vertex will be a maximum or a minimum**

Example: Is the vertex from part B a minimum or a maximum

## **d) How to find the domain and range based on the vertex**

Example: What is the domain and range for the equation in part A? Use the minimum or maximum that you found.

## **e) The formula used for throwing/dropping something that describes its height over time**

Example: Mr. Chevy threw a football across the bus lot. He released the ball 5 feet above the ground. The football was thrown with a velocity of 20 ft/sec. Write an expression that describes the football's height over time.

**f) How to find the maximum height for an object that is thrown/dropped**

Example: What is the maximum height of the football Mr. Chevy threw?

**g) How to find when the object that is thrown/dropped will hit the ground**

Example: Assuming that Mr. Chevy's ball doesn't hit anything on its journey, when will it hit the ground?

**h) How to solve quadratics by**

**i) Graphing**

Example: Solve  $m^2 - 5m + 4 = -2$  by graphing

**ii) Factoring**

Example: Solve  $n^2 + 3n - 12 = 6$  by factoring

**iii) Completing the square**

Example: Solve  $x^2 - 10x + 26 = 8$  by completing the square

**iv) Using the quadratic formula**

Example: Solve  $2k^2 + 9k = -7$  using the quadratic formula

**i) What is the discriminant and what does it tell you**

Example: Find the discriminant of the quadratic  $5x^2 + 9x = -4$ . What does this tell you?

**j) What is standard form of a quadratic**

Example: Write  $y = -3(x-2)^2 - 4$  in standard form.

**k) What is vertex form of a quadratic**

Example: Write Write  $y = (x + 5)(x + 4)$  in standard form

**l) How do you find the vertex of a quadratic on your calculator**

Example: Find the vertex of  $y = 3x + 4x^2 - 2$  using your graphing calculator.

**m) How do you find a solution of a quadratic on your calculator**

Example: What are the solutions to the quadratic that you graphed in part L? Use your calculator to solve.

**n) How to solve a system of linear and quadratic equations by**

**i) Graphing**

Example: Solve the system by graphing  $y = x^2 - 5x - 4$   $y = -2x$

**ii) Substitution**

Example: Solve the system by substitution  $-x^2 - x + 19 = y$        $x = y + 80$

**iii) Elimination**

Example: Solve the system by elimination  $y = 5x - 20$        $y = x^2 - 5x + 5$

**iv) Graphing calculator**

Example: Solve the system using your graphing calculator  $y = -.5x^2 - 2x + 1$        $y + 3 = -x$