

$$5x - 2y \leq 75$$



$$\begin{bmatrix} a & b \\ c & d \end{bmatrix}$$



$$S = Pe^{rt}$$



$$APY = \left(1 + \frac{r}{n}\right)^n - 1$$

Math 1090 ~ Business Algebra

Section 3.2 Parabolas: Quadratic Equations in Two Variables

Objectives:

- Identify a quadratic function, including the dependent and independent variables.
- Sketch a graph of a quadratic function.
- Identify the vertex, the axis of symmetry, concavity, y-intercept and roots of a quadratic function.

A quadratic function in two variables can be written in the form

$$y = f(x) = ax^2 + bx + c. \quad a \neq 0, \quad a, b, c \in \mathbb{R}$$



How can we find the vertex?

Ex 1: For $y = -2x^2 - 4x + 6$

a) Find the vertex.

b) Is the vertex a min or max point?

Ex 2: For $y = x^2 - 6x + 9$,

a) Find the vertex.

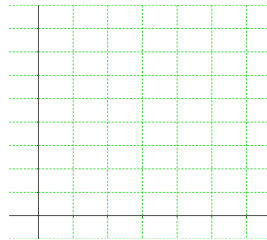
f) Sketch the graph

b) Is it a min or max point?

c) Find the zeros/roots of the graph.

d) Find the axis of symmetry

e) Find the y-intercept.



Ex 3: For $y = -x^2 + 4x + 5$,

- a) Find the vertex.
- b) Is this parabola concave up or concave down?
- c) Find the x and y-intercepts of the graph.



- d) Find the axis of symmetry
- e) Sketch the graph

Ex 4: For the parabola from example 1, $y = -2x^2 - 4x + 6$, sketch the graph.



Ex 5: If 100 ft of fencing is used to enclose a rectangular yard, find the area function. Find the dimensions of the rectangle that maximizes the area.