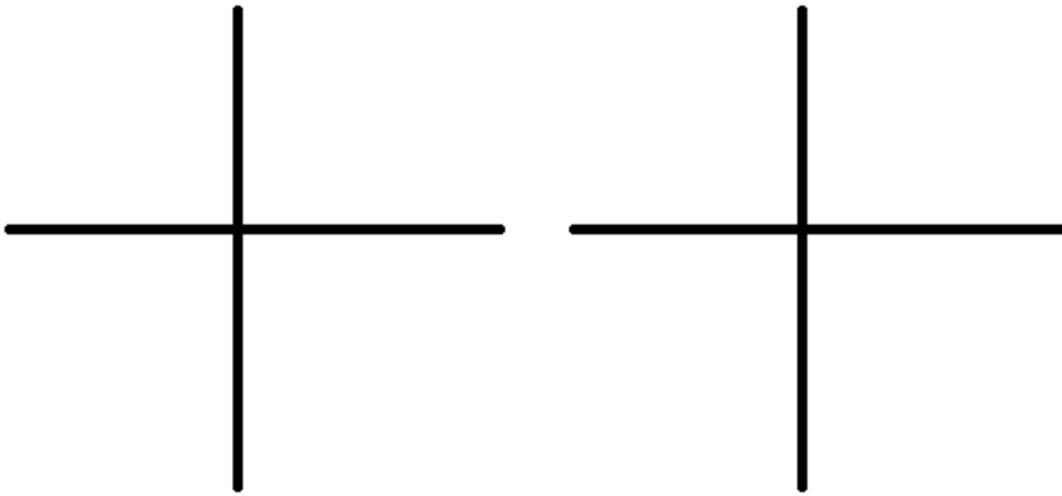


## **Section 1.5: Quadratic Model Graphs and Equations**

A quadratic model is written in standard form:

### **Part I: The graphs of quadratic models**



### **Part II: The concept of a vertex of a parabola**

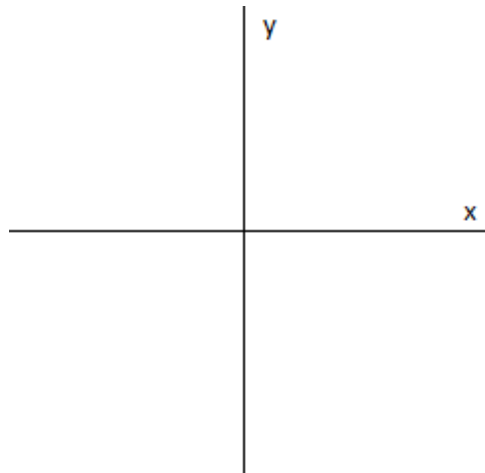
A vertex is a point  $(x, y)$  on a parabola where the parabola reaches a maximum or a minimum.

X-coordinate of a vertex:

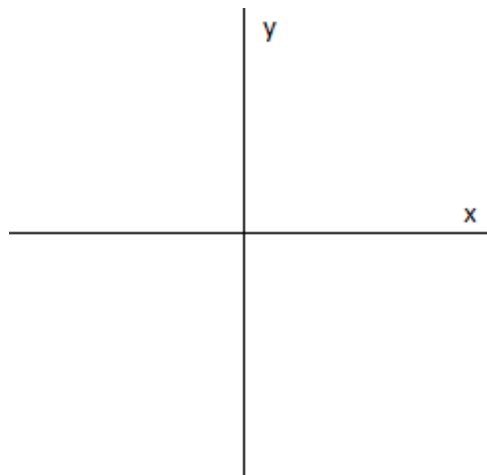
Y-coordinate of a vertex:

**Part III: Quadratic Model Examples (Algebraic)**

1. Find the location of the vertex and sketch a graph of the model  $y = x^2 - 6x + 4$ .



2. Find the location of the vertex and sketch a graph of the model  $y = -4x + x^2$ .



#### **Part IV: Quadratic Model Example (Application--Projectile Motion Problem)**

A football is kicked and follows the model:  $y = -0.03x^2 + 1.42x$  where  $y$  is the height of the ball in yards and  $x$  is the distance the ball travels along the ground, both distances in yards.

- Sketch a graph of the flight of the football.
- Find the maximum height the football reaches in the air in yards.
- Find the distance the ball travels along the ground in yards.