Your Turn:

2) Graph $y = 2x^2 + 2x + 1$

    a) Find the vertex and state if it is a maximum or ⟨minimum.⟩ $\left(-\frac{1}{2}, \frac{1}{2}\right)$

    b) Find the roots of the quadratic. *none*

Using the graphing method to solve real-world problems:

3. A toy rocket is fired upward from the ground. The path of the rocket is given by the equation $h = -16t^2 + 128t$, where h is height measured in feet and t is time measured in seconds after the rocket was launched. Find the following:

    $x = time\ (sec)$ $y = height\ (ft)$

    a) What is the <u>maximum</u> height that the rocket will reach?

$4, 256$

    The rocket will reach a max ht of 256 ft

    b) When will the rocket reach the maximum height?

    It'll take 4 sec for the rocket to reach max ht.
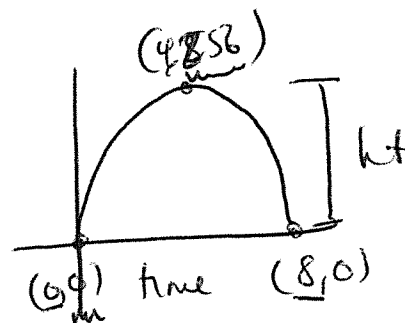
    c) How long is the rocket in the air?

    It's in the air for 8 seconds

    d) What is a reasonable domain and range for this quadratic model?

    Domain: $[0, 8]$ **Range:** $[0, 256]$

(4,256) (0,0) time (8,0) ht

    x
    true

— HOMEWORK —

4. A ball is thrown into the air. The path of the ball is represented by the following quadratic model, $h = -t^2 + 8t$, where h is the height in feet and t is the time in seconds. Find the following:

    $x = time\ (sec)$ $y = height\ (ft)$

    a) What is the maximum height of the ball?

$4, 16$

    The max ht the ball reaches is 16 feet

    b) When will the ball reach its maximum height?

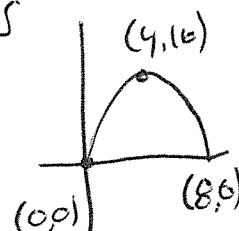   The ball reaches its max ht at 4 seconds

    c) How long is the ball in the air?

    The ball is in the air for 8 seconds

(4,16) (0,0) (8,0)

    d) What is a reasonable domain and range for this model?
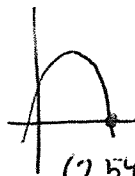
    D $[0, 8]$ R $[0, 16]$

5. A ball is shot from a canon into the air. The equation that gives the height h of the ball at any time t is $h = -16t^2 + 40t + 1.5$, where h is the height in feet and t is the time in seconds.
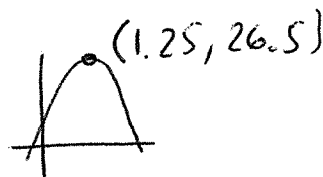
$x = time (sec)$ $y = height (ft)$

a) How long is the ball in the air?

The ball is in the air for 2.54 sec

b) What is the maximum height that the ball will reach?

The max ht the ball reaches is 26.5 ft.

(1.25, 26.5)

(2.54, 0)

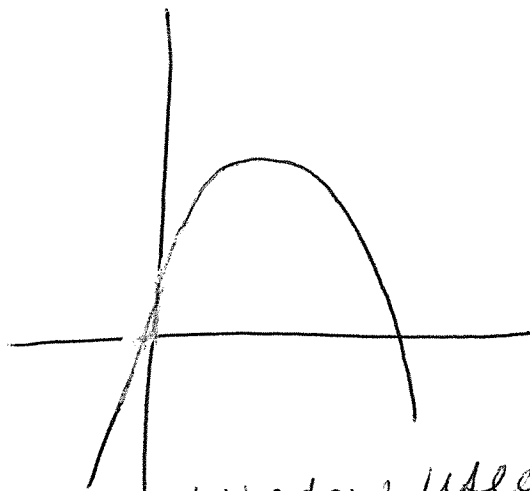c) How long will it take for the ball to reach the maximum height?

It takes 1.25 sec for the ball to reach max ht

d) What is a reasonable domain and range for this quadratic model?

Domain [0, 2.54]   Range [0, 26.5]

e) Sketch a graph to represent this quadratic model.

window used [-3, 5] by [-20, 50]