

Use desmos to graph the functions to help you answer the Q's.

See ANSWERS below on page 2.

1. Timmy threw a rock off of a cliff. The path of the rock can be modeled by the equation $y = -16x^2 + 16x + 480$, where x is the time in seconds and y is the height of the rock in feet.

- a. How long does it take the rock to reach its maximum height? *x-value max (vertex)*
b. What is the maximum height? *y-value vertex*

2. A rocket follows the path $y = -16x^2 + 128x$, where x is the time in seconds and y is the height in ft.

- a. How long does it take for the rocket to reach its maximum height? *x-value vertex*
b. What is the maximum height? *y-value vertex*

3. You are trying to dunk a basketball. You need to jump 2.5 feet in the air in order to do so. The height of your feet above the ground can be represented by the equation $y = -16x^2 + 12x$.

- a. What is the maximum height your feet will be above the ground? *y-value vertex*
b. Will you be able to dunk the basketball? *is y-value greater than 2.5ft?*

4. The profit of an independent film can be modeled by the equation $p = -.02x^2 + 3.4x - 16$, where x is the number of DVDs sold (in thousands) and p is the profit (in thousands of dollars).

- a. How many DVDs should the company produce to maximize the profit? *x-value vertex*
b. What will the maximum profit be? *y-value vertex*

5. Assume that a water balloon is launched with a catapult and its path can be modeled with the equation $h = -16t^2 + 50t + 20$.

- a. How long will the water balloon be in the air? *x-int to x-int distance*
b. What is the maximum height of the water balloon? *y-value vertex*

Answers:

1. a. 0.5 sec, b. 484 ft

2. a. 4 sec, b. 256 ft

3. a. 0.375 sec, b. no

4. a. 85 thousand, b. \$128.5 thousand

5. a. 3.46 sec, b. 59.06 ft