**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**APPLICATIONS OF QUADRATIC FUNCTIONS**

Using the graph at the right, It shows the height *h*

50

1

100

150

200

250

2

3

4

5

6

7

8

time (seconds)

h (height (feet))

in feet of a small rocket *t* seconds after it is launched.

The path of the rocket is given by the equation:

h = -16t2 + 128t.

1. How long is the rocket in the air? \_\_\_\_\_\_\_\_\_
2. What is the greatest height the rocket reaches? \_\_\_\_
3. About how high is the rocket after 1 second? \_\_\_\_\_\_\_
4. After 2 seconds,

 a. about how high is the rocket?\_\_\_\_\_\_\_\_\_

 b. is the rocket going up or going down? \_\_\_\_\_\_\_\_

5. After 6 seconds,

 a. about how high is the rocket? \_\_\_\_\_\_\_

 b. is the rocket going up or going down? \_\_\_\_\_\_\_\_

6. Do you think the rocket is traveling faster from 0 to 1 second or from 3 to 4 seconds? Explain your answer.

7. Using the equation, find the **exact** value of the height of the rocket at 2 seconds.

8. A ball is thrown in the air. The path of the ball is represented by the equation

h = -t2 + 8t. Graph the equation over the interval 0 ≤ t ≤ 8 on the accompanying grid.

time (seconds)

height (meters)

What is the maximum height of the ball?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

How long is the ball above 7 meter? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Quadratic Application Word Problems (AlgebricallY)

Things to remember when completing quadratic application word problems:

**t** is**\_\_\_\_\_\_**. It represents **\_\_**.

**h** or d is **\_\_\_\_\_\_\_\_\_**/distance. It represents **\_\_**.

When an object hits the **ground** (water), its height **= 0**. Solve by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

When an object is at its maximum or minimum, find the \_\_\_\_\_\_\_\_\_\_\_\_\_\_, using the formula \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. After *t* seconds, a ball tossed in the air from the ground level reaches a height of *h* feet given by the equation **h = 144t – 16t2**.

a. What is the height of the ball after 3 second?

b. What is the maximum height the ball will reach?

c. Find the number of seconds the ball is in the air when it reaches a height of 224 feet.

d. After how many seconds will the ball hit the ground before rebound?

1. A rock is thrown from the top of a tall building. The distance, in feet, between the rock and the ground t seconds after it is thrown is given by

**d = -16t2 – 4t + 382.**

1. What is themaximum height of the rock thrown?
2. How long did it take the rock to reach its maximum height?
3. How high was the rock after 4 seconds?
4. A rocket carrying fireworks is launched from a hill 80 feet above a lake. The rocket will fall into lake after exploding at its maximum height. The rocket’s height above the surface of the lake is given by

**h = -16t2 + 64t + 80**.

a. What is the height of the rocket after 1.5 second?

b. What is the maximum height reached by the rocket?

c. How long will it take for the rocket to hit 128 feet?

d. After how many seconds after it is launched will the rocket hit the lake?