NCM1B Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Unit 4 Part 2 Lesson 3.5 Homework: Quadratics Applications**

**NO GRAPHING CALCULATOR NEEDED FOR THESE PROBLEMS!!**

**I.**  A lacrosse player throws a ball upward from her playing stick with an initial speed, *v*0 , of 90 ft/sec. The height ***h*** in feet of the ball after ***t*** seconds is modeled by the equation:

 $h(t)=-16t^{2}+v\_{0} t+7$.

a. Rewrite the equation

b. What is the initial height of the ball?

#  Given ( 2.8 , 133.6 ) as the vertex, answer the following:

c. How long does it take the ball to reach the highest point in the air?

d. What was the ball’s greatest height?

e. Describe the vertex, what does it mean?

**II.** A science teacher shot a model rocket into the air with an initial velocity of 128 ft/s. The table below shows the various **heights** (in feet) recorded at certain **time** intervals (in seconds).

 **Use the table to answer the following:**

|  |  |
| --- | --- |
| **t** | **h(t)** |
| 0 | 0 |
| 1 | 112 |
| 2 | 192 |
| 3 | 240 |
| 4 | 256 |
| 5 | 240 |
| 6 | 192 |
| 7 | 112 |
| 8 | 0 |
|  |  |
|  |  |

a. When is the rocket is at ground level? \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_

b. The rocket is 192 feet in the air at what times? \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_

c. What is the maximum height reached by the rocket? \_\_\_\_\_\_\_\_\_\_\_\_\_

d. How long does it take for the rocket to reach the maximum height? \_\_\_\_\_\_\_\_\_\_\_\_

e. How long was the rocket airborne? \_\_\_\_\_\_\_\_\_\_\_\_\_

f. What is the rocket’s height at 3 seconds? \_\_\_\_\_\_\_\_\_\_\_ 7 seconds? \_\_\_\_\_\_\_\_\_\_

g. Describe the vertex, what does it mean? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**III.** In football, the height of the football reached during a pass can be modeled by the equation:

x

y

$h(t)=-16t^{2}+28t+6$, where the height, ***h***  is in feet and the time, ***t***, is in seconds.

 **Explain the following and then label them on the parabola to the right.**

a. Label and Tell where on the parabola you would find the ball’s maximum height.

b. Label and Tell where on the parabola you could locate the ball being on the ground.

c. Label and Tell where on the parabola you could locate the ball’s initial height.

d. From what height was the football thrown?

e. Unfortunately, the quarterback overthrew the football. If the zeros for this function are located at

 $\{-0.193$ and $1.94\}.$ Which zero is relevant here and what does it mean?

f. The vertex for this function is located at $(0.875, 18.25).$ What does this mean? Provide a sentence using context from the problem.