NC Math 1B Unit 4 Part 2 Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Homework Lesson 3: Max and Min Problems**

**I. Using the table, sketch a graph & answer the questions. Label – give a name for the x and y-axis.**

A boy climbs up a tree and throws an apple. The apple’s approximate height ***h(t)*** above the ground after a time of ***t*** seconds is given by the equation:

 $h\left(t\right)=-1t^{2}+4t+12$

***t h(t)***

0 12

1 15

2 16

3 15

4 12

5 7

6 0

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1. Maximum height of the apple is \_\_\_\_\_\_\_\_\_\_\_ **2.** How long is the apple airborne? \_\_\_\_\_\_\_\_\_\_\_\_

3. What point on the graph represents the apple’s starting height? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. What is the apple’s starting height? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. The apple’s starting height is which number in the given equation? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| --- | --- |
| **t** | ***h(t)*** |
| 0 | 0 |
| 1 | 144 |
| 2 | 256 |
| 3 | 336 |
| 4 | 384 |
| 5 | 400 |
| 6 | 384 |
| 7 | 336 |
| 8 | 256 |
| 9 | 144 |
| 10 | 0 |

**II.** A science teacher shot a model rocket into the air with an initial velocity of 160 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:**

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

7. The rocket is 336 feet in the air at what times? \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_

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

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

10. What is the rocket’s height at 2 seconds? \_\_\_\_\_\_\_\_\_\_\_ 8 seconds? \_\_\_\_\_\_\_\_\_\_

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

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

**III. Given the information, make a table and a graph to answer the questions. Label each axis.**

If a rocket is shot upward with an initial velocity, $v\_{0}$, of 96 feet per second, the height ***h(t)*** (in feet) that it will reach at the end of ***t*** seconds is given by the quadratic equation: $h(t)=-16t^{2}+v\_{0}, t$graphed below.

12. Rewrite the equation replacing $v\_{0}$, with its given value: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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 ***t h(t)***

 0

 1

 2

 3

 4

 5

 6

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

14. After how many seconds is the maximum height reached? \_\_\_\_\_\_\_\_\_\_\_\_\_

15. At what times is the rocket at a height of 128 feet? \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_

16. When is the rocket on the ground? \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_

17. Describe what the vertex point means \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_