

NAME: \_\_\_\_\_

## Product Development: Model Rockets as Toys

1. You work in the product development department for a model rocket toy company. Check out [https://youtu.be/E6e\\_Wj-LBXk](https://youtu.be/E6e_Wj-LBXk) for an example of one of your competitors. You have been asked to answer some questions that might be needed in creating a label/package for the product. The following quadratic function was developed from tests during product development for the rocket which contains no parachute release:

$$h(t) = -16t^2 + 112t$$

where  $h(t)$  represents height above the ground in feet after  $t$  seconds.

- a. What is the maximum height that the rocket will reach?
- b. How long will it take the rocket to reach its maximum height?
- c. How long will the rocket be in the air before hitting the ground?
- d. At what time(s) will the rocket be at a height of 80 feet?
- e. If the FAA (Federal Aviation Administration) regulates model rockets to be flown under 400 feet, does the model rocket that you are developing meet FAA regulations? How much over or under the altitude restriction does your product reach?

2. Design a label for the packaging of the model from #1. Provide any vital details that should be included on the label to build consumer interest in purchasing your product.