Class Activity 9L Rocket Science Reasoning

1. Rocket scientists determined that t seconds after launch, a rocket will be

$$16(2 + t)(22 - t)$$

feet above the ground.

a. Describe the structure of this expression.

b. Reason about the structure to determine which values for t will make the expression have a value of 0. To help your thinking: when you multiply numbers, how can the result be 0?

c. Why would the rocket scientists want to know when the expression has a value of 0?

2. The rocket scientists determined that another expression for the height of the rocket is

$$2304 - 16(t - 10)^2$$

feet above the ground t seconds after launch.

a. Describe the structure of this expression.

b. Reason about the structure of $2304 - 16(t - 10)^2$ to determine the largest value it can have and to determine the value of t at which this occurs.

To help your thinking, consider these questions:

- Why can $16(t - 10)^2$ never be negative?
- How can you use the structure of $16(t - 10)^2$ to determine for which value of t is it 0?

c. Why would the rocket scientists want to know the largest value of the expression?