7.10 Fireworks

A Solidify Understanding Task

Every night at 9:45, fairgoers get to experience a magnificent fireworks show.

Each firework is carried by a rocket that behaves like a projectile. The firework is designed to explode when the rocket reaches its highest point in the air. Once the rocket explodes, the sparkles of different colors fly out of the rocket and the rocket falls back to the ground.

accel = -16

Below, you are given information about the flight of each rocket.

GLITTER PALM   CROSSETTE   WATERFALL

Glitter Palm (graph of ft. vs s)

130
50
80
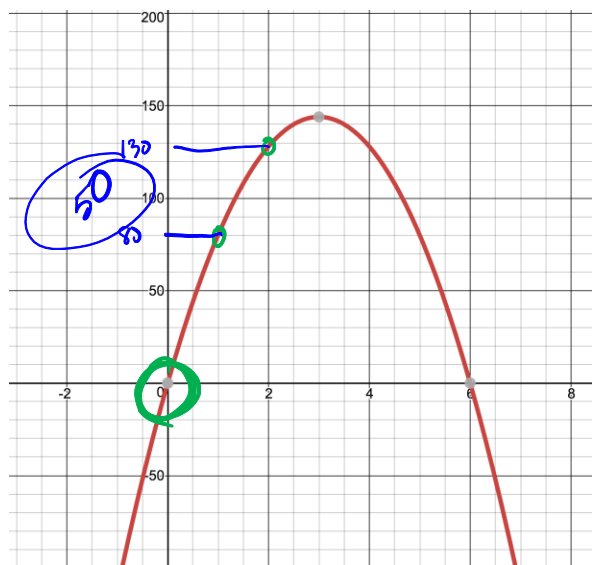
Crossette

Rocket height above ground after t seconds is given by $h(t) = -16t^2 + 50t + 10$

Shortone

(1,44) (2,46)

2

Waterfall

The rocket has an initial height of 5 feet, and an upward initial velocity of 120 feet per second.

$h(t) = -16t^2 + 120t + 5$

fallone   *(1,109) (2,181)*

12

Answer the following questions. **Be sure to explain your thinking and make connections between representations.**

1. Which firecracker explodes at the greatest height?

   waterfall

2. Which rocket takes the longest to reach maximum height?

   waterfall

3. Which rocket takes the longest to fall back to the ground?

   waterfall

4. Which rocket takes off from the ground?

   Glitter Palm

5. If the rockets are launched simultaneously, which one has a greater rate of change between 1 and 2 seconds?

   waterfall

6. When is each rocket higher than 100 feet?