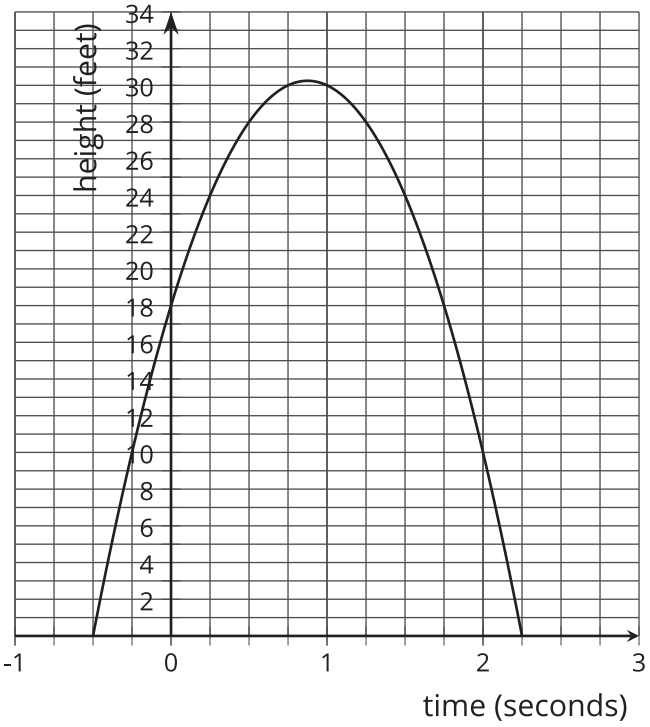
Unit 7, Lesson 14

Interpreting Representations

Let's interpret tables, graphs, and equations.

14.1 Notice and Wonder: The Arrow

An archer shoots an arrow. The arrow's height above level ground, in feet, is modeled by the equation $h(t) = (1 + 2t)(18 - 8t)$, and also represented by this graph and table. The time t is measured in seconds.



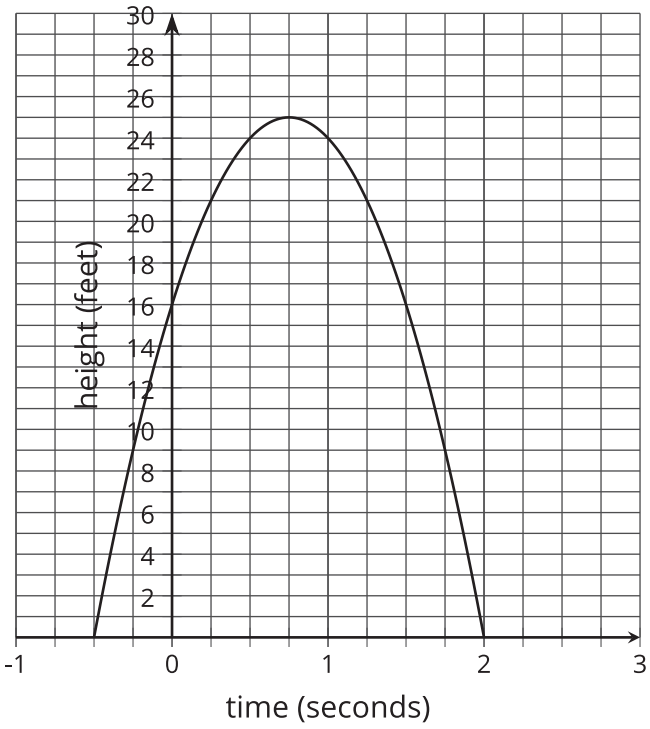
t	0	0.5	2	2.25
$h(t)$	18	28	10	0

What do you notice? What do you wonder?

14.2 Three Objects

Some different objects are launched into the air. The height of each object is modeled as a function of time in seconds.

- The height, in feet, of the first object is modeled by the function d and represented by the graph.



- The height, in feet, of the second object is modeled by the function f and represented by the table.

t	0	0.25	1	1.75
$f(t)$	14	18	18	0

- The height, in feet, of the third object is given by the equation $g(t) = (16t + 4)(2.5 - t)$.

1. For each object, from what height was it launched?

2. For each object, how long was it in flight before it hit the ground?

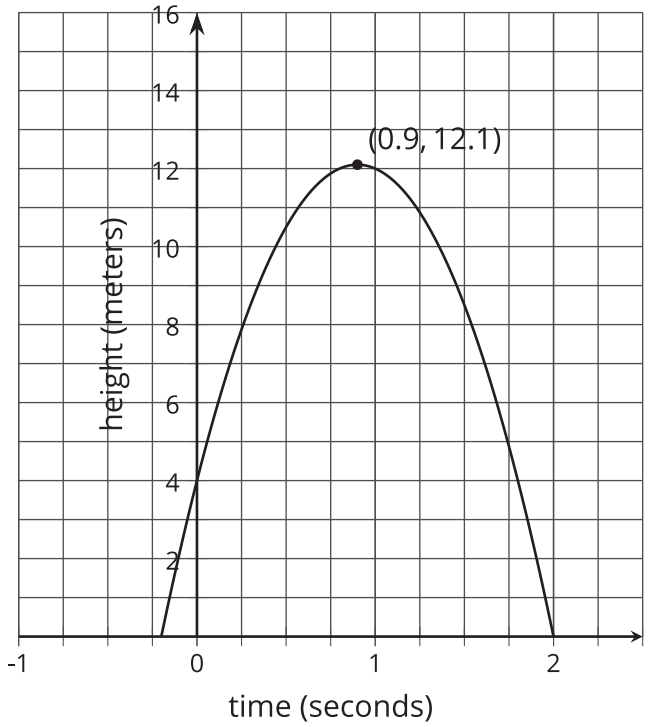
3. For each object, what was its maximum height and when did it reach its maximum height? If needed, give your best estimate.

14.3 Comparing Two Situations with Different Representations

Two objects are thrown into the air.

The height of Object M in meters is modeled by the function $m(x) = (5 + 10x)(1.5 - x)$ with x representing time in seconds.

The height of Object P, in meters, is modeled by the function p, represented by the graph.



1. For each object, figure out:
   a. the time at which the object hit the ground

   b. the height from which the object was thrown

   c. the maximum height of the object

   d. the time at which the object reached its maximum height

2. Which object was launched from a greater height? Explain your reasoning.

3. Which object hit the ground first? Explain your reasoning.

4. Which object reached a greater maximum height? Explain your reasoning.