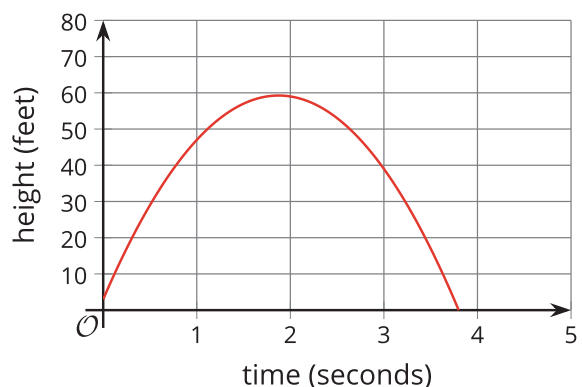


Lesson 6 Practice Problems

- The height of a diver above the water, is given by $h(t) = -5t^2 + 10t + 3$, where t is time measured in seconds and $h(t)$ is measured in meters. Select **all** statements that are true about the situation.
 - The diver begins 5 meters above the water.
 - The diver begins 3 meters above the water.
 - The function has 1 zero that makes sense in this situation.
 - The function has 2 zeros that make sense in this situation.
 - The graph that represents h starts at the origin and curves upward.
 - The diver begins at the same height as the water level.
- The height of a baseball, in feet, is modeled by the function h given by the equation $h(t) = 3 + 60t - 16t^2$. The graph of the function is shown.

- About when does the baseball reach its maximum height?
- About how high is the maximum height of the baseball?
- About when does the ball hit the ground?



- Technology required.* Two rocks are launched straight up in the air. The height of Rock A is given by the function f , where $f(t) = 4 + 30t - 16t^2$. The height of Rock B is given by g , where $g(t) = 5 + 20t - 16t^2$. In both functions, t is time measured in seconds and height is measured in feet.

Use graphing technology to graph both equations. Determine which rock hits the ground first and explain how you know.

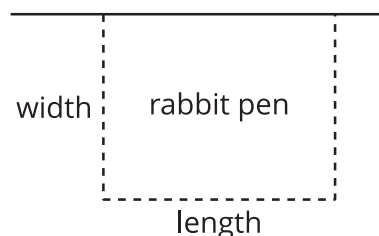
4. Each expression represents an object's distance from the ground in meters as a function of time, t , in seconds.

Object A: $-5t^2 + 25t + 50$

Object B: $-5t^2 + 50t + 25$

- Which object was launched with the greatest vertical speed?
- Which object was launched from the greatest height?

5. Tyler is building a pen for his rabbit on the side of the garage. He needs to fence in three sides and wants to use 24 ft of fencing.

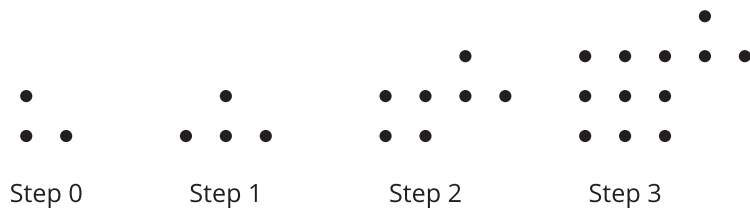


- The table shows some possible lengths and widths. Complete each area.
- Which length and width combination should Tyler choose to give his rabbit the most room?

length (ft)	width (ft)	area (sq ft)
8	8	
10	7	
12	6	
14	5	
16	4	

(From Unit 6, Lesson 1.)

6. Here is a pattern of dots.



step	total number of dots
0	
1	
2	
3	

- Complete the table.
- How many dots will there be in Step 10?
- How many dots will there be in Step n ?

(From Unit 6, Lesson 2.)

7. The function f is defined by $f(x) = 2^x$ and the function g is defined by $g(x) = x^2 + 16$.

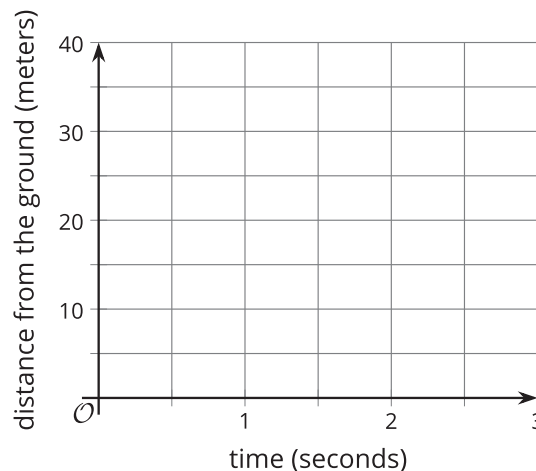
- Find the values of f and g when x is 4, 5, and 6.
- Are the values of $f(x)$ always greater than $g(x)$ for all x ? Explain how you know.

(From Unit 6, Lesson 4.)

8. Han accidentally drops his water bottle from the balcony of his apartment building. The equation $d = 32 - 5t^2$ gives the distance from the ground, d , in meters after t seconds.

a. Complete the table and plot the data on the coordinate plane.

t (seconds)	d (meters)
0	
0.5	
1	
1.5	
2	

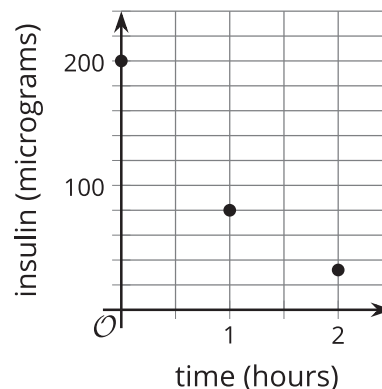


b. Is the water bottle falling at a constant speed? Explain how you know.

(From Unit 6, Lesson 5.)

9. The graph shows how much insulin, in micrograms (mcg), is in a patient's body after receiving an injection. Assume the amount of insulin continues to decay exponentially.

- Write an equation giving the number of mcg of insulin, m , in the patient's body h hours after receiving the injection.
- After 3 hours, will the patient still have at least 10 mcg of insulin in their body? Explain how you know.



(From Unit 5, Lesson 6.)