BOLTING ANIMALS Galapagos Tortoise

Name: _____

You are a **Biomechanical Engineer** specializing in animal locomotion. You are advising a medical supply company on their development of **prosthetics** for animals.

Your Challenge: How does the speed of the Galapagos tortoise compare to humans?

After reading a variety of research papers, speed of an animal is an important factor to consider when designing prosthetics. You've created a table to show the estimated distance run by a Galapagos tortoise over time.

1.   The ratios in the table are proportional. Complete the table.

Galapagos Tortoise	
Seconds	**Feet**
	0
4	1.2
	1.8
15	
	5.4
30	

2.   Construct a function to describe the relationship between seconds (*s*) and feet (*f*).

3.   Graph the function on a coordinate plane.

4.   a.   What is the slope of the line?

        b.   Interpret what the rate represents.

5.   How long would it take a Galapagos tortoise to run 1 mile? Explain your reasoning.

6.   a.   How far would a Galapagos tortoise run in 1 minute?

     b.   If they could maintain the same speed, how far would a Galapagos tortoise run in 1
          hour?

To consider how animals using your prosthetics compare against a human competitor, you've
decided to look at Usain Bolt, one of the fastest humans. He has a top speed of 40 feet per second.

7.   a.   Complete the table below to show the distances run over time by Bolt.

Usain Bolt	
Seconds	Feet
0	
5	
10	
15	
20	
25	
30	

     b.   Imagine that Usain Bolt and the Galapagos tortoise are racing against each other. Give
          the Galapagos tortoise a head start of 200 feet to make the race more fair. Graph the
          speed of Usain Bolt in the same coordinate plane as the speed of the Galapagos
          tortoise. Be sure to label your graphs.

8.   If s is seconds and f is feet, write the equation of Usain Bolt's line in the form $y = mx + b$.

9.   a.   Compare the two lines and estimate the coordinates of the point where they cross.

     b.   Interpret what this point represents.

10. With the Galapagos tortoise's head start of 200 feet, how long would it take for Usain Bolt to
     catch him? Solve a system of equations to find the time and distance that the two would meet.