Name: _____   Date: _____

That's Some Slippery Slope!

The Living Ocean Institute is a world-renowned oceanographic research organization specializing in Pacific plant and animal life. One of its research vessels is located in the waters off Antarctica. On a recent expedition, Living Ocean Institute researchers discovered a previously unknown species of penguin, the Mini-Emperor. They found that the cute little critters enjoy sliding down ice embankments on their bellies!

Use your knowledge of functions to answer the questions about the Living Ocean Institute's work below.
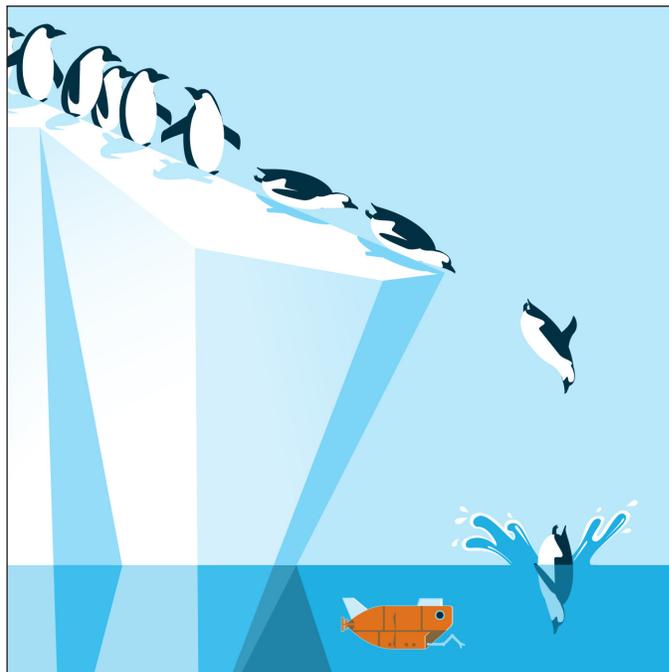
WORK THE MATH

Use a separate sheet of paper for your responses.

1 Researchers measured the speed and distance traveled by the Mini-Emperors down a 600-foot hill. They found that the penguins traveled at a constant rate of speed. After 3 seconds, the penguins traveled 60 feet and after 6 seconds, they traveled 120 feet.

  a. What is the rate of change of this function?

  b. Fill in the missing cells of the table below:

Time (in seconds)	0	3	6	9	
Distance (in feet)		60	120		240

  c. What is the formula for this function?

  d. Represent this function in the form of a graph.

  e. How far will the Mini-Emperors travel after 45 seconds?

2 The trustees of the Living Ocean Institute were so delighted by the Mini-Emperors that they decided to open an exhibit at their aquarium/aquatic research center in the United States. They decided to construct *Penguin Paradise*, a spectacular exhibit in the aquarium that would have a separate $5 admission fee per visitor. They kept separate records to track whether or not the exhibit was profitable (in this case, profit or loss would equal total admission fees minus the cost to build the exhibit). After the 50,000th visitor, the exhibit had a profit of $50,000. After the 100,000th visitor, the exhibit had a profit of $300,000.

  a. What is the rate of change in this function?

  b. How much did the exhibit cost to build? Hint: Find the initial value.

  c. What is the formula for this function?

  d. Represent this function in the form of a graph.