

11. [15 points] The velociraptor population on the earth one year and four years after a huge meteor hits the earth is 2 million and 1.6 million respectively. Let P be the velociraptor population (**in millions**) on the earth t years after the meteor hits the earth.

- a. [5 points] Suppose that the velociraptor population on the earth decreased exponentially after the meteor hits the earth. In this case, $P = g(t)$ for some function g . Find a formula for $g(t)$. Your answer should be in **exact form**.

$$g(t) = \underline{\hspace{10cm}}$$

- b. [4 points] Suppose that the velociraptor population on the earth is a power function of t , the number of years after the meteor hits the earth. In this case, $P = h(t)$ for some function h . Find a formula for $h(t)$. Your answer should be in **exact form**.

$$h(t) = \underline{\hspace{10cm}}$$

The problem continues on the next page

The velociraptor population on the earth one year and four years after a huge meteor hits the earth is 2 million and 1.6 million respectively. Let P be the velociraptor population (**in millions**) on the earth t years after the meteor hits the earth.

- c. [1 point] Under which assumption does P decrease faster to 0, if we assume that $P = g(t)$ or if we assume that $P = h(t)$? Circle your answer.

$$P = g(t)$$

$$P = h(t)$$

Cannot be determined.

- d. [3 points] Suppose that the velociraptor population on the earth decreased linearly after the meteor hits the earth. In this case, $P = f(t)$ for some function f . Find a formula for $f(t)$.

$$f(t) = \underline{\hspace{10em}}$$

- e. [2 points] Give a practical interpretation of the horizontal intercept of the graph $P = f(t)$.

12. [6 points] Let $N(x)$ be the cost (in dollars) to produce x pieces of chocolate. The chocolates are then put into boxes containing ten pieces of chocolate each. The packaging costs for each box of chocolates is \$0.15. Write down a mathematical expression describing the following.

- a. [2 points] The average cost (in dollars per piece of chocolate) of producing c chocolates.

$$\text{Answer} = \underline{\hspace{10em}}$$

- b. [2 points] The cost in dollars of producing the fifteenth piece of chocolate.

$$\text{Answer} = \underline{\hspace{10em}}$$

- c. [2 points] The total cost in dollars (including packaging costs) of producing b boxes of chocolate.

$$\text{Answer} = \underline{\hspace{10em}}$$