

5. [12 points] Three researchers Dr. Banner, Dr. Storm and Dr. Kyle are studying a population of an alien species, commonly known as CATS (Category A Threats). The study of CATS started in 2010 and the scientists observed a population of 125 CATS in 2012 and a population of 600 CATS in 2014. In all the functions below, the variable t represents the number of *years after 2010*. Show all your work.

- a. [3 points] Doctor Banner believes the CATS population is described by the linear function $R(t)$. Find a formula for $R(t)$.

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

- b. [4 points] Doctor Storm thinks that a linear model is not adequate to describe the population of CATS. She believes that the number of CATS can be described by a quadratic function $S(t)$ whose minimum occurred in 2012. Find a formula for $S(t)$.

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

- c. [5 points] On the other hand, Doctor Kyle strongly believes that the CATS' population size must grow exponentially. He describes the population of CATS using the exponential function $K(t)$. Find a formula for $K(t)$. Your answer must be in **exact form**.

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