

4. [14 points] It is projected that the number of marine plant and animal species on earth will decrease by 40% by the year 2050. The current (2010) instantaneous rate of marine species loss is 80,000 species per year.
- a. [6 points] Assuming the number of marine species is modeled by an exponential function, write an exponential function $M = f(t)$ which outputs the total number of marine species t years after 2010.
- b. [3 points] According to your model, about how many marine species are there currently (in 2010)? About how many will there be in 2050?
- c. [5 points] In what year will there be half as many marine species as there are currently (in 2010)? Using derivatives, approximate how many marine species will be lost that year.