Quiz 3

Name: _____

1. The fox population in 2001 was three-hundred thousand. Researchers find that they grow at a rate of about four percent per year.

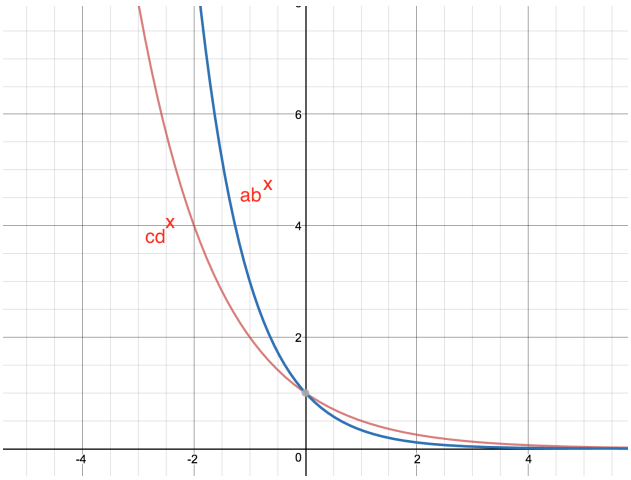
   (a) [4 pts] Find a formula for the population P as a function of time, t, in years.

   $$P(t) = 3(1.04)^t,$$

   where we measure population in hundred-thousands.

   (b) [1 pt] How many foxes are predicted in 2027?
   $P(26) = 8.32$, so there will be about $832,000$ foxes.

2. [3 pts] For the graph below, which value is larger: b or d? Explain.



d is the larger quantity here. Imagine the graphs of $(1/2)^x$ and $(1/3)^x$.

3. [2 pts] Your friend, Joe, models a growing bacteria colony and comes up with the model $B(t) = 10(0.81)^t$ for the number of Bacteria, B, as a function of time t in minutes. What is wrong with Joe's model? Explain.

   His growth factor is less than 1, which is an exponential decay model. We wanted an exponential growth model.

4. [5 pts] If $\$3,000$ is invested at a rate of 3.05% annually, compounded quarterly, how much money is there after seven years?

$$V = 3\left(1 + \frac{0.0305}{4}\right)^{4\cdot 7} = 3.71,$$

   so we have about $\$3,710$.