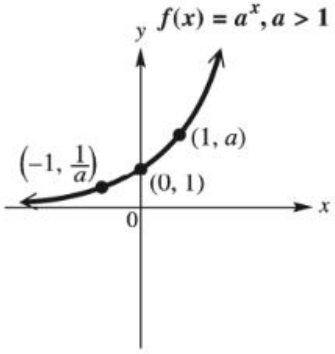
4.2 Exponential Functions
Honors Algebra 2 with Trig

1. Approximate the following with a calculator. Round answers to the nearest thousandth.
   a. $5^{-1.5}$ b. $e^{2.75}$

Parent Graph of an exponential:



Domain: _____

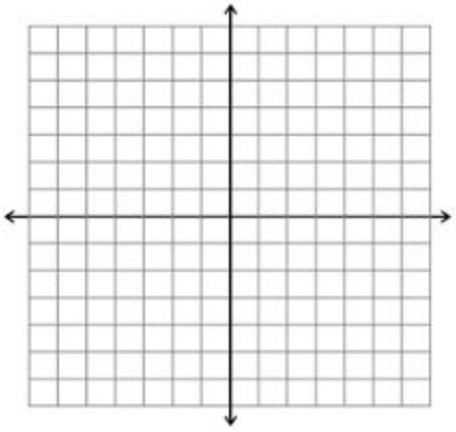
Range: _____

Horizontal Asymptote: _____

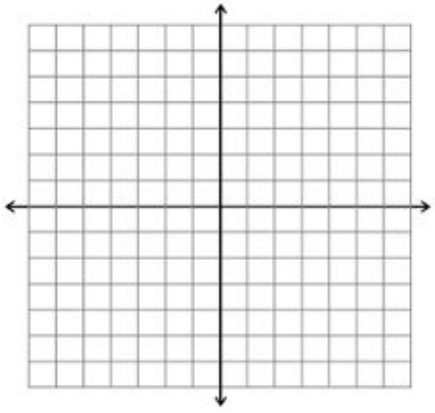
Key points: _____

2. Draw a sketch of each exponential function:

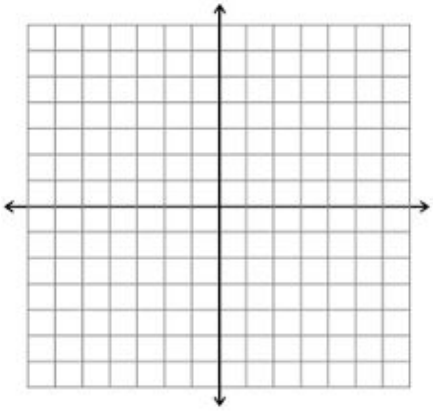
a. $f(x) = 3^x$



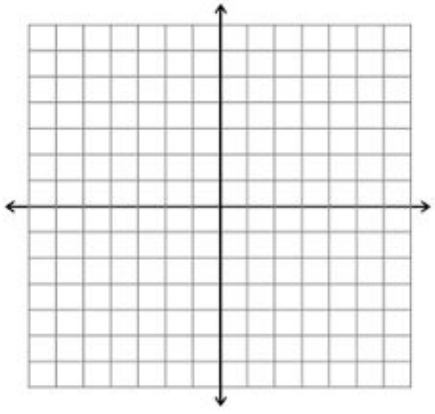
b. $f(x) = -3^x$



c. $f(x) = 3^{x+2} - 4$



d. $f(x) = 3^{-x} + 1$



3. Solve the following exponential equations:
   a. $5^x = \frac{1}{125}$ b. $3^{x+1} = 9^{x-3}$ c. $x^{2/3} = 251$

Compound Interest Formulas	
$A = P(1 + \frac{r}{n})^{nt}$	$A = Pe^{rt}$

4. Find the accumulated value of an investment of $5000 for 10 years at an interest rate of 6.5% if the money is:
   a. Compounded semiannually b. Compounded monthly

5. Suppose you have $6000 to invest. Which investment yields the greatest return over 4 years:
   a. 8.25% compounded quarterly b. 8.3% compounded semiannually

   c. 8.275% compounded continuously

6. The number of bacteria present in a culture can be modeled by the equation $B(t) = 10e^{0.483t}$, where t is the time in minutes.
   a. Find $B(1)$. b. What does this mean in context?

7. The 1986 explosion at the chernobyl nuclear power plant in the former Soviet Union sent about 1000 kilograms of radioactive cesium-137 into the atmosphere. The function $f(x) - 1000(0.5)^{x/30}$ describes the amount, $f(x)$, in kilograms, of cesium-137 remaining in Chernobyl x years after 1986. If even 100 kilograms of cesium-137 remain in Chernobyl's atmosphere, the area is considered unsafe for human habitation.

   a. Find $f(80)$.

   b. What does this mean in practical terms?