Math 120 **Lesson 4-3 Notes**

Exponential Functions

Topics

1) **Define exponential functions.**
2) **Evaluate exponential functions with and without a calculator.**
3) **Graph exponential functions.**
4) **Define the number e.**
5) **Evaluate and graph functions with base e.**
6) **Use compound interest formulas.**

1) Define exponential functions.

Definition:

2) Evaluate exponential functions with and without a calculator.

Approximate the number using a calculator. Round your answer to three decimal places.

1) $5^{\sqrt{3}}$

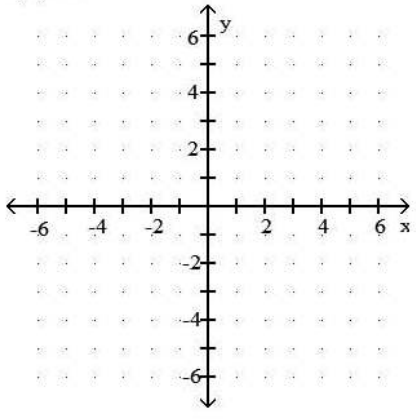
2) 4.5^{π}

3) $2^{-2.1}$

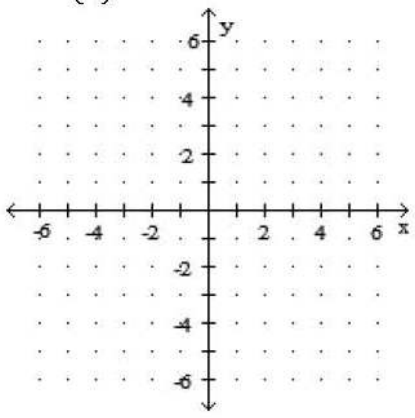
3) Graph exponential functions.

Graph the function by making a table of coordinates.

5) $f(x) = 3^x$

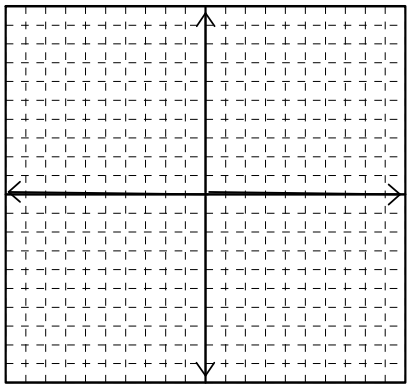


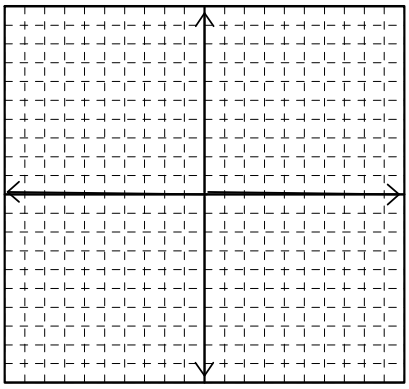
6) $f(x) = \left(\frac{1}{4}\right)^x$



Exponential Functions

The two basic exponential graphs:





All of the shifting rules work with these graphs.

4) Define the number e.

$$\left(1+\frac{1}{n}\right)^{n}$$

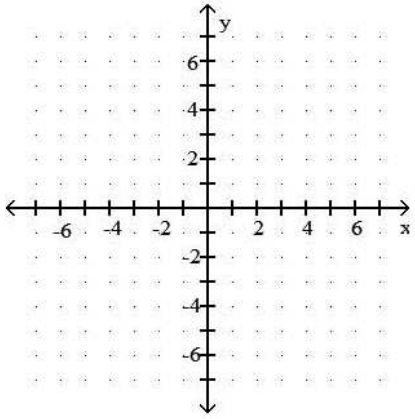
5) Evaluate and graph functions with base e.

The size of the beaver population at a national park increases at the rate of 5.1% per year. If the size of the current population is 151, find how many beavers there should be in 4 years. Use the function $f(x) = 151e^{0.051t}$ and round to the nearest whole number.

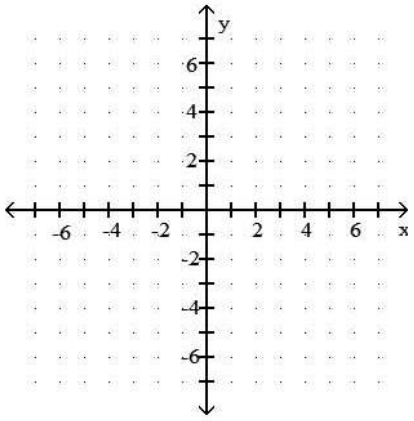
A sample of 800 g of lead-210 decays to polonium-210 according to the function given by $A(t) = 800e^{-0.032t}$, where t is time in years. What is the amount of the sample after 50 years (to the nearest g)?

Exponential Functions

') Graph of $g(x) = e^{x-2} - 4$.



Use the graph of $f(x) = e^x$ to obtain the graph of $g(x) = e^{-x}$.



6) Use compound interest formulas.

Use the compound interest formulas $A = P\left(1 + \frac{r}{n}\right)^{nt}$ and $A = Pe^{rt}$ to solve.

17) Find the accumulated value of an investment of \$5000 at 5% compounded monthly for 8 years.

18) Suppose that you have \$8000 to invest. Which investment yields the greater return over 9 years: 6.25% compounded continuously or 6.3% compounded semiannually?