Honors Pre-Calc **11-13-07**

Exponential Functions

are functions with a variable exponent.

$$f\left(x\right)=a\bullet b^{x}$$

1. Identify which functions are exponential. If they are state the ***initial value*** and ***base***.

   a. $f\left(x\right)=-2x^{5}$

   b. $f\left(x\right)=4\bullet 3.5^{x}$

   c. $f\left(x\right)=1^{x}$

   d. $f\left(x\right)=0.23\bullet 5^{-x}$

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2. Evaluate without a calculator.

   a. $f(x) = 6 \bullet 3^x$ for $x = -2$

   b. $f(x) = -2 \bullet 8^x$ for $x = -\frac{2}{3}$

   c. $f(x) = 2^x$ for $x = \pi$

3. Determine the functions for y1 and y2 from the table below.

X	Y1	Y2
-2	352	.15625
-1	176	.625
0	88	2.5
1	44	10
2	22	40
3	11	160
4	5.5	640

X= -2

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Exponential Growth

$$f\left(x\right)=a\bullet b^{x}$$

Exponential Decay

$$f\left(x\right)=a\bullet b^{x}$$

4. Describe the transformation of the function $f\left(x\right)=2^{x}$.
   a. $f\left(x\right)=2^{x+3}$
   b. $f\left(x\right)=2^{4x}$
   c. $f\left(x\right)=2^{-x}+3$

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The Natural Base "e"

$$e = \lim_{x \to \infty} \left(1 + \frac{1}{x} \right)^x$$

***The* Exponential Function**

$$f(x) = a \bullet e^{kx}$$

$$f(x) = a \bullet b^x \qquad \Rightarrow \qquad f(x) = a \bullet e^{kx}$$

where $b^x = e^{kx}$

5. Describe the transformation of the function $f(x) = e^x$.
   a. $f(x) = e^{3x}$
   b. $f(x) = e^{-x}$
   c. $f(x) = 3e^x$