Exponential Growth & Decay HW

1. Growth   Initial Value: 2
   Factor: 3.5   Rate: 250% inc

2. Decay   Initial Value: 4.2
   Factor: 0.09   Rate: 91% dec

3. Decay   Initial Value: 5
   Factor: 0.33   Rate: 67% dec.

4. Growth   Initial Value: 21
   Factor: 2.5   Rate: 150% inc.

5. Decay   Initial Value: 12
   Factor: 0.25   Rate: 75% dec.

6. $f(x) = 25000 (0.8)^x$

7. $f(3) = 12,800$ mice

8. $f(t) = 200,000 (1.02)^t$

   a. $f(10) = \$243,799$

Exponential Growth/Decay HW   *Key*

Determine if the function represents a growth/decay. Identify the initial value, growth factor and rate. (Do not graph)

1. $y = 2(3.5)^x$
   IV: 2
   GF: 3.5
   250% growth

2. $y = 4.2(.09)^x$
   IV: 4.2
   GF: .09
   91% Decay

3. $y = 5\left(\frac{1}{3}\right)^x$
   IV = 5
   GF = 1/3
   66.7% decay

4. $y = 21\left(\frac{5}{2}\right)^x$
   IV = 21
   GF = 5/2
   150% growth

5. $y = 12\left(\frac{1}{4}\right)^x$
   IV = 12
   GF = 1/4
   75% Decay

6. The mice population is 25,000 and is decreasing by 20% each year. Write a model for this situation.

$$y = 25000(0.80)^x$$

   a. Given the model for #6, what will be the mice population after 3 years?

   $$25000(0.80)^3 = 12,800 \text{ mice}$$

7. A house that costs $200,000 will appreciate in value by 2% each year. Write a function to model the cost of the over time.

   $$200,000(1.02)^x$$

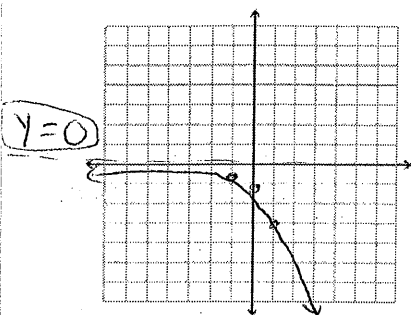   a. Find the value of the house at the end of 10 years. $200,000(1.02)^{10} = \$243,799.88$

Graph the following functions. State the initial value, domain, range and asymptote.
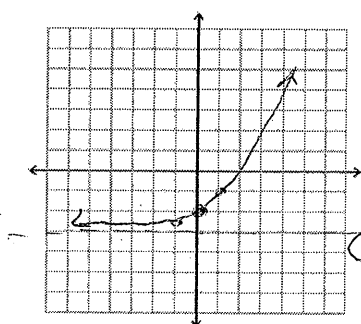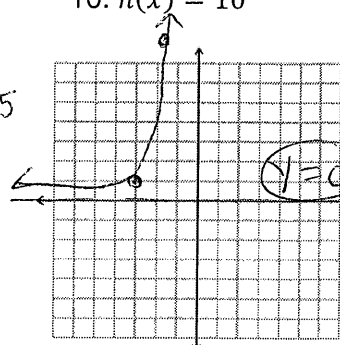
8. $f(x) = -3^x$

   Y=0

-1	-1/3
0	-1
1	-3

9. $g(x) = 2^x - 3$

-1	-2.5
0	-2
1	-1

   Y = -3

10. $h(x) = 10^{x+3}$

   Y=0

-2	10
-1	100
0	1000
-3	1

11. $f(x) = -3^{-x}$

   Y=0

-1	-3
0	-1
1	-1/3

12. $y = 1 + 2^{x+1}$

   Y=1
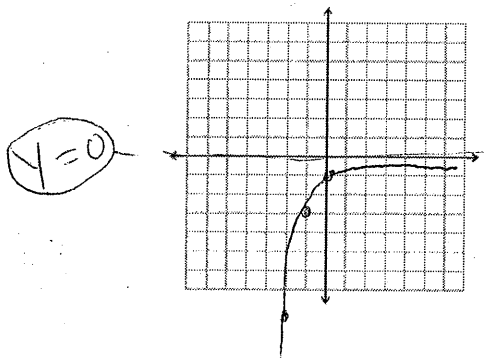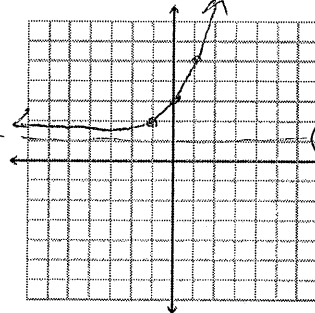
-1	2
0	3
1	5

13. The consumption of soda has increased each year since 2000. The function $C(t) = 179(1.029)^t$ models the amount of soda consumed in the world, where C is the amount consumed in billions of liters and t is the number of years since 2000. **Graph and sketch the function. How much soda was consumed in 2005?**

Initial Value 179

2.9% growth

$$179(1.029)^5 = 206.505 \text{ billion liters}$$