City Semester   Name:_____
Test #2
Show all work for full credit.

1. Assuming the exponential functions are of the form $f(x) = ab^x$, give the equations of the exponentials that contain the following points.
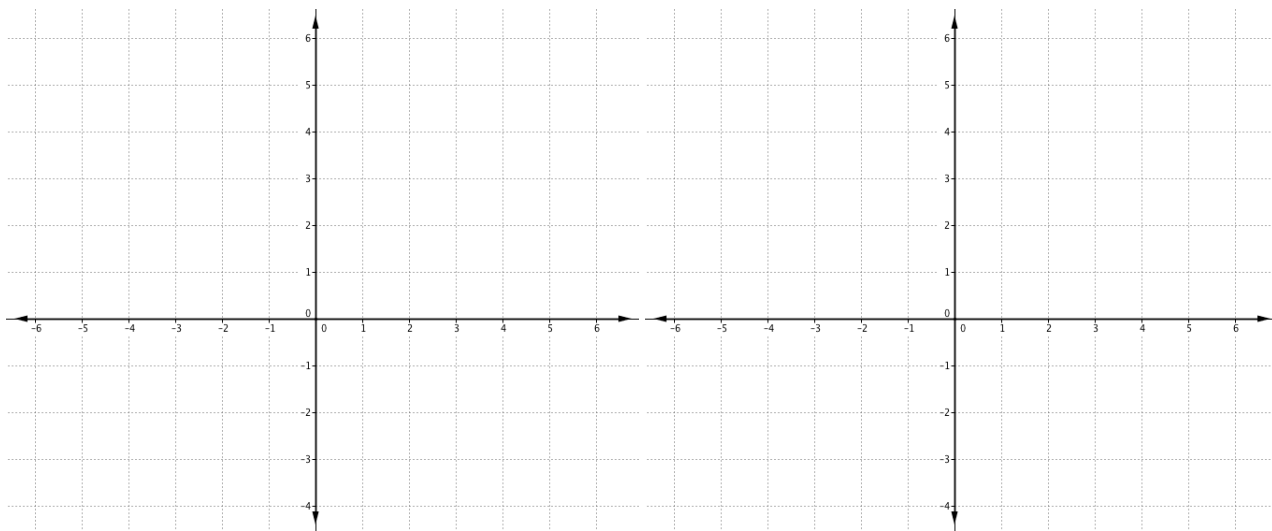
   (a) $A(0, 10)$, $B(3, 33.75)$

   (b) $A(-1, 32)$, $B(3, 1/8)$

2. Give a sketch of each of the following exponential functions. Label the y-intercept and the horizontal asymptote. Give the function's domain and range.

   (a) $f(x) = 3e^x + 1$ (b) $g(x) = -2(0.80)^x$

3. If the population of bugs in a terrarium was 100 on March 1st, and it grew to 650 on March 31st, then what is the average daily percent growth of the bug population in this terrarium?

4. If you invested 1,000 dollars in the bank how much money would you have in the following situations.

   (a) The bank gives you 5% interest compounded annually for 8 years.

   (b) The bank gives you 5% interest compounded quarterly for 8 years.

   (c) The bank gives you 4.5% interest compounded continuously for 8 years.

5. A typical cup of coffee has 100mg of caffeine. Every hour 16% of the caffeine in one's body is metabolized and eliminated. Write a model of the amount of caffeine in a person's body after drinking 1 cup of coffee in terms of time in hours. How much caffeine remains after 5 hours?

6. If a nominal rate of 8% is compounded continously, what is the effective annual rate?

7. A certain model of car costs 64,000 dollars. Assume that the car loses 40% of its value after five years of ownership.

   (a) Supposing this depreciation is exponential, find a formula for the value of the car at time t, measured in years.

   (b) Supposing this depreciation is linear, find a formula for the value of the car at time t, measured in years.

(c) If this were your car, and you were trading it in after 4 years, which model would you want to use? Explain.

8. Without the aid of your calculator or any software match each exponential expression to one of the graphs below.

(a) $10(1.2)^t$ (b) $10(1.5)^t$ (c) $20(1.2)^t$

(d) $30(0.85)^t$ (e) $30(0.95)^t$ (f) $30(1.05)^t$
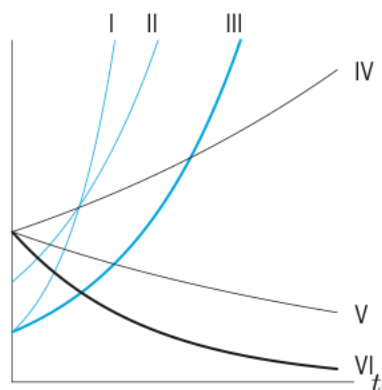
9. Let $f(x) = -e^{-x}+4$. Without the aid of your calculator or any software answer the following:

(a) What is the domain of f?

(b) What is the range of f?

(c) Does f have a vertical asyptote? Explain.

(d) Does f have a horizontal asymptote? Explain.

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10. Please write out the following statement and sign your name to it as testament to its truth. 'I have worked on this assignment for at most 60 minutes and I have neither given nor received any unauthorized help on this work'