HN Math III Notes Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Unit 2 Day 3  ***Exponential Growth and Decay***

General Form of an Exponential Function:

* **b = Growth Factor**
* **If b > 1, the “object” is growing.**
* **If 0 < b < 1, the “object” is decaying.**
* **b = 1 + r; where r = rate of growth or decay.**

General Form for continuous growth or decay:

* **If r > 0, the “object” is growing.**
* **If r < 0, the “object” is decaying.**
* **The general form can use other variables!**

State whether the equation is growth or decay and then find the rate.

1. y = 3(1.34)x 2. y = 2(0.78)x 3. P(t) = 4e -0.234t

4. Since January 1980, the population of the city of Brownville has grown according to the mathematical model, where *x* is the number of years since January 1980.

a) Explain what the numbers 720,500 and 1.022 represent in this model.

b) What would the population be in 2000 if the growth continues at the same rate?

c) Use this model to predict about when the population of Brownville will first reach 1,000,000.

5. In 1972 in Khulna, Bangladesh there was a smallpox outbreak that spread at a continuous rate of 10% (based on time measured in weeks). If a similar outbreak were to happen at BHS today, and 10 people are infected to begin, how long would it take for 100 students to be infected?

6. E. coli bacteria double in population every thirty minutes. If the initial population is 85, what’s the population of bacteria after three hours? After one day?

7. Strapped for cash, you decide to borrow money from a local crime lord. This turns out to be yet another instance of poor judgment on your part. The loan has a 22% interest per year.

a) How much will you owe on a loan of $5,000 after one year?

b) What about after three years?

8. “Bird Flu” is creating havoc for the residents of Gloomy Falls, Mass., population 937. The population is decreasing at a continuous rate of 1.5%. How many residents are left after the four-month outbreak?

9. You bought a Boston Whaler in 2014 for $12,500. The boat’s value depreciates by 7% a year.

a) How much is the boat worth now?

b) When will the boat be worth $5000?