

# Pre-Calculus Math 12

## Chapter 3: Exponents and Logarithms

### Lesson 1: Continuous Exponential Growth

#### Question #1

Reference Q.17801

Label each part of the exponential growth equation,  $A = Pe^{kt}$ .

#### Question #2

Reference Q.17802

Since  $e > 1$ , how can we turn the growth equation,  $A = Pe^{kt}$  into a decay equation?

#### Question #3

Reference Q.17803

Label each of the following as exponential growth or decay.

- $A = 200e^{-0.2t}$
- $A = 200e^{3t}$
- $A = \frac{200}{e^t}$

#### Question #4

Reference Q.17804

Answer the questions based on the equation,  $A = 35e^{(0.2)(4)}$ .

- What is the initial amount?
- What is the amount of time?
- Is this a growth or decay function?
- What is the continuous rate of growth/decay?

#### Question #5

Reference Q.17805

Answer the questions based on the equation,  $60 = 2.3e^{-3t}$ .

- What is the initial amount?
- What is the final amount?
- Is this a growth or decay function?
- What is the continuous rate of growth/decay?

#### Question #6

Reference Q.17806

Evaluate the expression,  $A = 25e^{(0.5)(20)}$

- $A = 2527.2$
- $A = 550661.6$
- $A = 679.5$
- $A = 824.4$

#### Question #7

Reference Q.17807

Evaluate the expression,  $A = 0.5e^{(-0.25)(2)}$

- $A = 1.284$
- $A = 0.7788$
- $A = -0.6795$
- $A = 0.303$

#### Question #8

Reference Q.17808

Evaluate the expression,  $A = \frac{15}{e^{(2)(4.5)}}$

- $A = 0.00185$
- $A = 121546.3$
- $A = 0.4511$
- $A = 9.1351$

#### Question #9

Reference Q.17809

What is the final amount given that the initial amount is 13, the time is 2 years and the continual growth constant is 0.5?

#### Question #10

Reference Q.17810

What is the final amount given that we start with 200 and this amount decays by -0.3 over 5 years?

#### Question #11

Reference Q.17811

A plant is growing at a continuous rate of 12% per year. If its initial height is 5 cm, how tall will it be after 3 years?

### Question #12

*Reference Q.17812*

The population of a town of 2000 people explodes due to a recently discovered mine. If the continual growth rate is 0.693, what is the population of the town after only 3 years?

### Question #13

*Reference Q.17813*

If you were given \$100 to invest at a continual rate of 5%, how long would it take for you to double your money?

### Question #14

*Reference Q.17814*

If you were given \$20 to invest at a continual rate of 2.5%, how long would it take for you to triple your money?

### Question #15

*Reference Q.17815*

How much money would you have to invest in order to have \$400 after 10 years if the bank offered you a continual interest rate of 4%.

### Question #16

*Reference Q.17816*

How much money would you have to invest in order to have \$5000 after 18 years if the bank offered you a continual interest rate of 1.5%.

### Question #17

*Reference Q.17817*

A radioactive substance has a decay rate of 50% per year. If we initially have 45 grams, how much will remain after 4 years?

### Question #18

*Reference Q.17818*

A radioactive substance has a decay rate of 33% per year. If we initially have 5 grams, how much will remain after 25 years?

### Question #19

*Reference Q.17819*

100% of a radioactive substance decays per year. If we initially have 15 grams, how much will remain after 9 years?

### Question #20

*Reference Q.17820*

A radioactive substance is safe to handle when there is less than 1 gram of it left. If this substance has a decay rate of 70% per year, how long will it be before a 100 g substance is safe to handle?