Answers

Continuous vs Non-Continuous Exponential Equations - 2

Write an equation for each situation below. Assume non-continuous unless continuous growth or decay is explicitly stated. Choose what your independent variable should stand for.

1) A bank account is started with a $5,000 deposit and the interest rate is 1.1% compounded continuously.

$y = 5000e^{.011x}$

x = #years

2) You invest $10,000 in a bank CD with 0.9% interest compounded monthly.

$y = 10{,}000\left(1 + \frac{.009}{12}\right)^{12x}$

x = #years

3) The value 'V' of an investment is tripling every 15 years.

$V = V_0(3)^{\frac{x}{15}}$

x = #years

4) A population is 300 is increasing at a continuous rate of 5%.

$P = 300e^{.05t}$

t = #years

5) A bank account is started with a $5,000 deposit and the interest rate is 1.1% compounded annually.

$P = 5000(1.011)^x$

x = #years

6) The number of teddy bears in a store begins at 2000 and decreases at a continuous rate of 3.5% per day throughout the month of December.

$T = 2000e^{-.035t}$

t = #days

7) The population of 700 is doubling every 50 years.

$P = 700(2)^{\frac{t}{50}}$ t = #years

8) The initial population of bacteria is doubling 3 times per hour.

$P = P_0(2)^{3x}$ x = # hours

9) My new $2,000 computer is expected to depreciate by 40% each year.

$C = 2000(.6)^x$ x = #years

10) A g_0 gram sample of an isotope has a half-life of 5700 years.

$g = g_0\left(\frac{1}{2}\right)^{\frac{x}{5700}}$

11) The population of bacteria is 5000 and is decreasing continuously at a rate of 1.2%.

$B = 5000e^{-.012t}$ t = #years

12) A population 9,000 and is decreasing at a rate of 6% every 5 years.

$P = 9000(.94)^{x/5}$ x = #years

13) If a population of bacteria is decreasing at a rate of 20% per hour, how many hours will it take until only 1% of the original population is still alive?

x = # hours

$100(.8)^x = 1$

Think about the different ways you could solve this!