Applications Problems Involving Continuous Compounding

There is a special growth formula that we use for problems involving ***continuous compounding.***

Continuous Compound Interest Formula

$$y = a(e)^{r \cdot t}$$

y = final amount **a = starting amount** **r = rate (in decimal form)** **t = time**

1. The growth of a bacteria colony is a petri dish can be modeled by the equation $y = 75e^{.4t}$, where t is the time in hours. Approximate the number of bacteria after two full days.

$t=48$

$y = 75e^{.4*48} = \boxed{1.635 \times 10^{10}}$

2020
$-2004 = 16$

2. Your grandparents deposited \$500 into a trust fund for you the year you were born. If the bank paid 6.2% interest compounded continuously, what is the account balance today?

$\frac{}{100} = .062$

$y = 500e^{.062*16} = \boxed{1348.31}$

$y = 500e^{.062*15} = \boxed{1267.25}$

a?

3. Nalani plans to buy a new car in 5 years. How much should you deposit into a bank paying 7% continuous interest if she plans on spending \$20,000 for her car?

Compounded

y

$r = .07$

divide

$\frac{20000}{e^{.07*5}} = \frac{a\boxed{(e)^{.07*5}}}{} = \frac{20000}{e^{.07*5}} = \boxed{14,093.76}$

\$100

4. Nick is depositing money into an account paying 5¾% interest compounded continuously. How long will it take for his money to double?

$t=?$

\$200

$\frac{5.75\%}{100} = .0575$

$\frac{200}{100} = \frac{100e^{.0575*t}}{100}$

$2 = e^{.0575*t}$

$\boxed{t=12}$