Bellwork Alg 2B 6th Hour Monday, October 30, 2017

Solve.

1. $12(5^{2x-1}) + 2 = 73$

2. $10e^{x+3} - 8 = 55$

3. The population of a city is 250,000 and has been decreasing 2.3% each year. Find the number years, to the nearest hundredth, until the population reaches 150,000.

4. You invest $20,000 in an account that pays 7% annual interest. If interest is compounded continuously find the number of years, to the nearest hundredth, that it will take to end up with $500,000.

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Answers

Solve.

1. $12(5^{2x-1}) + 2 = 73$

$-2 \quad -2$

$\frac{12(5^{2x-1})}{12} = \frac{71}{12}$

$5^{2x-1} = 71/12$

$\log_5\left(\frac{71}{12}\right) = 2x-1$

$\frac{\log\left(\frac{71}{12}\right)}{\log(5)} = 2x-1 \rightarrow$ after adding 1 & $\div$ by 2

$x = 1.05$

2. $10e^{x+3} - 8 = 55$

$+8 \quad +8$

$\frac{10e^{x+3}}{10} = \frac{63}{10}$

$e^{x+3} = 6.3$

$\ln(6.3) = x+3$

$x = \ln(6.3) - 3$

$x = -1.16$

3. The population of a city is 250,000 and has been decreasing 2.3% each year. Find the number years, to the nearest hundredth, until the population reaches 150,000.

$100\% - 2.3\% = 97.7\%$

$\frac{150,000}{250,000} = \frac{250,000(.977)^x}{250,000}$

$.6 = .977^x$

$\log_{.977}(.6) = x$

$x = 0.05$ yrs

4. You invest \$20,000 in an account that pays 7% annual interest. If interest is compounded continuously find the number of years, to the nearest hundredth, that it will take to end up with \$500,000.

$\frac{500,000}{20,000} = \frac{20,000e^{.07t}}{20,000}$

$25 = e^{.07t}$

$\frac{\ln 25}{.07} = \frac{.07t}{.07}$

$t = 45.98$ yrs