Algebra 2 Bellwork Thursday, June 9, 2016

Solve each equation. Round to the nearest hundredth.

1. $5^x = 100$

2. $9^{6x} + 19 = 104$

3. $\text{Log}_5(4x + 7) = 6$

4. The population of a city in 2009 was 200,000. The population has been increasing 3.1% each year.

a) Find the number of years it will take the population of the city to reach 500,000. Round to the nearest hundredth.

b) How many years ago was the poplulation of the city 120,000? Round to the nearest hundredth.

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Solve each equation. Round to the nearest hundredth.

1. $5^x = 100$

$x = \log_5 100 = \frac{\log 100}{\log 5} = 2.86$

2. $9^{6x} + 19 = 104$

$-19 \quad -19$

$9^{6x} = 85$

$6x = \log_9 85$

$6x = \frac{\log 85}{\log 9}$

$x = \left(\log 85 / \log 9\right) \div 6$

$x = 0.34$

3. $\text{Log}_5(4x + 7) = 6$

$5^6 = 4x + 7$

$15625 = 4x + 7$

$-7 \quad -7$

$\frac{15618}{4} = \frac{4x}{4}$

$x = 3904.5$

4. The population of a city in 2009 was 200,000. The population has been increasing 3.1% each year.

$100 + 3.1 = 103.1\% \rightarrow b = 1.031$

a) Find the number of years it will take the population of the city to reach 500,000. Round to the nearest hundredth.

$\frac{500,000}{200,000} = \frac{200,000(1.031)^x}{200,000}$

$2.5 = 1.031^x$

$x = \log_{1.031} 2.5 = \frac{\log 2.5}{\log 1.031}$

$x = 30.01$ yrs

b) How many years ago was the poplulation of the city 120,000? Round to the nearest hundredth.

$\frac{120,000}{200,000} = \frac{200,000(1.031)^x}{200,000}$

$.6 = 1.031^x$

$x = \log_{1.031} .6$

$x = \frac{\log .6}{\log 1.031}$

this is 16.73 years ago

$x = -16.73$ years