Quiz

Student Name:

Each question is worth two points. You must show all your work to receive full credit.

1. Evaluate the following expression. Round your answer to the nearest tenth.

   $40(1+0.02)^{23-10}$
   $40(1.02)^{23-10}$
   $40(1.02)^{13}$
   $40(1.29)$

   51.7

2. Algebraically solve the following equation for x. Round your answer to the nearest tenth.

   $52=13(2.05)^x$
   $\left(\frac{52}{13}\right)=2.05^x$
   $x=log_{2.05}\left(\frac{52}{13}\right)$

   1.9

The following three questions are all based on Capital City, USA. The population of Capital City in 2000 was 3,271. The city was growing at a rate of 1.19%.

3. Write an exponential function that models population P as a function of year t.

   $P(t)=3271(1+0.0119)^{t-2000}$

4. Use this model to predict the population of Capital City, USA in 2020.

   $P(2020)=327(1+0.0119)^{2020-2000}$
   $P(2020)=3271(1.0119)^{2020-2000}$
   $P(2020)=3271(1.0119)^{20}$
   $P(2020)=3271(1.27)$

   4,154

5. Use this model to estimate the year in which the population of Capital City, USA will reach 5,000.

$5{,}000=3{,}271(1+0.0119)^{t-2000}$

$5{,}000=3{,}271(1.0119)^{t-2000}$

$\left(\frac{5{,}000}{3{,}271}\right)=(1.0119)^{t-2000}$

During 2035

$\log_{1.0119}\left(\frac{5{,}000}{3{,}271}\right)=t-2000$

$t=2000+\log_{1.0119}\left(\frac{5{,}000}{3{,}271}\right)$

$t=2035.9$

6. Explain how you arrived at your answer to #5. (This explanation can include an explanation of your computation as well as any rounding that may have happened.)

A strict calculation will yeild 2035.9. This means that the population will reach 5,000 during the year 2035; you can not just round to the nearest whole number.