Math 130 - Quiz 12

Name _____

December 4, 2019

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (8 points) Solve each equation.

   (a) $2^{3x-7} = 32$

   (b) $3^x = 2^{x-1}$

   (c) $\log x + \log(x+3) = 1$

   (d) $e^{2x} - 9e^x + 14 = 0$

Turn over.

2. (4 points) In 1997, the population of the United States was about 266 million, and it was growing exponentially at 0.9% per year. Find a model of the form $P(t) = P_0 e^{kt}$ that describes the population at time t. What does your model predict the U.S. population will be in 2020?

3. (3 points) One-hundred animals were released into a preserve where their population grows according to the model $P(t) = \dfrac{1000}{1 + 9e^{-0.1656t}}$, where t is measured in months. After how long will the population reach 999 animals? Will the population ever reach 1000?