WeBWorK Assignment Homework06 is due: 05/21/2016 at 04:08pm EDT.

Reference: Axler, Precalculus, 2nd ed, Sections 3.5 and 3.7

Here’s the list of **functions and symbols** that WeBWorK understands.

1. (1 pt) Use logarithms to find an exact solution to the equation below.
   \[ e^{0.08t} = 11 \]
   \[ t = \] __________

2. (1 pt) Find the exact solution to the equation below. (*Do not give a decimal approximation.*)
   \[ 3 \ln(2x + 2) = 20 \]
   \[ x = \] __________

3. (1 pt) Convert the exponential equation \( Q = 0.1e^{0.3t} \) to the form \( Q = ab^t \) and enter the values of \( a \) and \( b \) below.
   \[ a = \] __________
   \[ b = \] __________

4. (1 pt)

   Without a calculator, match each function with its graph.

   ![Graph](image)

   ![Graph](image)

   ![Graph](image)

   ![Graph](image)

   ![Graph](image)

   ![Graph](image)

5. (1 pt)

   Solve each of the following equations for \( x \).

   \[ \ln(8x + 4) = 2 \]
   \[ x = \] __________

   \[ \ln(8x^3) = \ln(5x) + 5 \]
   \[ x = \] __________

6. (1 pt)

   Solve each of the following equations. If there are multiple solutions, enter them as a comma separated list. If there are no solutions, enter "None".

   \[ \ln(x + 1) - \ln(x - 5) = 5. \]
   \[ x = \] __________

   \[ \ln(x - 5) - \ln(x + 1) = 5 \]
   \[ x = \] __________

   \[ \ln(x) + \ln(x + 1) = 5 \]
   \[ x = \] __________

7. (1 pt)

   Solve each of the following equations. If there are multiple solutions, enter them as a comma separated list. If there are no solutions, enter "None".

   \[ e^{2x} = 5e^x - 5 \]
   \[ x = \] __________

   \[ e^{2x} = -5e^x - 5 \]
   \[ x = \] __________

   \[ e^{2x} = 5e^x + 5 \]
   \[ x = \] __________

8. (1 pt)

   Find the area of the shaded region in the graph on the left above. You can see a bigger version by clicking on the image.

   **Area = _____ square units**
The area of the shaded region on the right is exactly 0.7 square units. Find the $x$ coordinate $c$ of the right edge of the region.

$c = ___$

9. (1 pt) A population is 15000 in year $t = 0$ and grows at a continuous rate of 7.3% per year.

(a) Find a formula for $P(t)$, the population in year $t$.

$P(t) = ___$

(b) By what percent does the population increase each year? ___% (Round to 0.001%)

10. (1 pt) A population shrinks from its initial level of 19,000 at a continuous decay rate of 5.5% per year.

(a) Find a formula for $P(t)$, the population in $t$ years.

$P(t) = ___$

(b) By what percent does the population shrink each year? ___% (Round to the nearest 0.001%)

11. (1 pt) In 2004 the gross world product, $W$, (total output in goods and services) was 54.7 trillion dollars and growing at a continuous rate of 3.8% per year.

(a) Write a formula for $W$, the GWP (in trillions of dollars), as a function of years, $t$, since 2004.

$W(t) = ___$

(b) Estimate the value of $t$ when the GWP is predicted to reach 95 trillion dollars.

$t = ___$ (Round to the nearest 0.1 years.)

12. (1 pt) The voltage $V$ across a charged capacitor is given by $V(t) = 5e^{-0.6t}$ where $t$ is in seconds.

(a) What is the voltage after 5 seconds? ____ volts (round to the nearest 0.001 volts)

(b) When will the voltage be 1? In ____ seconds (round to the nearest 0.01 sec.)

(c) By what percent does the voltage decrease each second? ____% (round to the nearest 0.001%)

13. (1 pt) You deposit $4000 into an account that earns 7% compounded annually. A friend deposits $3500 into an account that earns 6.95% annual interest, compounded continuously. Will your friend's balance ever equal yours? If so, when? If not, enter NEVER.

They will be equal in about _______ years (round to nearest whole year).