

WeBWork Assignment Homework05 is due : 05/21/2016 at 04:07pm EDT.

Reference: Axler, Precalculus, 2nd ed, Sections 3.2, 3.3, and 3.4

Here's the list of **functions and symbols** that WeBWork understands.

1. (1 pt) Find the exact solution to the exponential equation $13 = 14(0.6)^q$. (Do not give a decimal approximation.)
 $q =$ _____

2. (1 pt)
Use a calculator or computer to solve the following equation for x .

$$7^x = 18.$$

Answer: $x =$ _____

3. (1 pt)
Use a calculator or computer to solve the following equation for x .

$$10^{\sqrt{x}} = 6.$$

Answer: $x =$ _____

4. (1 pt)
Use a calculator or computer to solve the following equation for x .

$$9^{(x^2)} = 13.$$

If there are multiple solutions, enter them as a comma separated list. If there are no solutions, enter "None".

Answer: $x =$ _____

5. (1 pt)
You deposit \$4300 in an account earning 11% interest, compounded annually. The amount in the account after t years is

$$p(t) = 4300 \cdot 1.11^t$$

How much is in the account after 2 years? Give your answer to the nearest cent (hundredth of a dollar)

Answer: _____ dollars

How long will it take to double your initial investment? Give your answer to the nearest tenth of a year.

Answer: _____ years

6. (1 pt)
How many digits are in the decimal representation of 7^{627} ? You will need to use a calculator or computer, but it is unlikely that you will be able to calculate 7^{627} directly.
Answer: _____ digits

7. (1 pt) $\log_{21}(14) =$ _____
 $\log_{14}(21) =$ _____

8. (1 pt) Using laws of logarithms, write the given expressions using sums and/or differences of logarithmic expressions which do not contain the logarithms of products, quotients, or powers.

$$\ln(77x) = \underline{\hspace{2cm}}$$

$$\log(x^{70}) = \underline{\hspace{2cm}}$$

$$21 \log(\sqrt[3]{x}) = \underline{\hspace{2cm}}$$

9. (1 pt) Using laws of logarithms, write the expression below as a single logarithm.

$$\frac{1}{2} \log x + 4 \log y = \log(\underline{\hspace{2cm}})$$

10. (1 pt)
You don't know the values of x or y , but you are given

$$\log_{10} x = 9.7, \quad \log_{10} y = 3.$$

Calculate numerical values for each of the following.

$$\log_{10}(5x^2y) = \underline{\hspace{2cm}}$$

$$\log_{10}\left(\frac{x}{3y^2}\right) = \underline{\hspace{2cm}}$$

$$\log_{10}(\sqrt{x}\sqrt[3]{y}) = \underline{\hspace{2cm}}$$

11. (1 pt) Find the exact solution to the equation below.

$$\frac{\log(x^2) + \log(x^3)}{\log(100x)} = 4$$

$x =$ _____

12. (1 pt)
How many digits are in the decimal representation of $15^{628}6^{563}$? You will need to use a calculator or computer, but it is unlikely that you will be able to calculate $15^{628}6^{563}$ directly.
Answer: _____ digits

13. (1 pt) The magnitude of an earthquake is measured relative to the strength of a "standard" earthquake, whose seismic waves are of size W_0 . The magnitude, M , of an earthquake with seismic waves of size W is defined to be $M = \log_{10}\left(\frac{W}{W_0}\right)$. The value M is called the Richter scale rating of the strength of the earthquake.

(a) Let M and m represent the magnitude of two earthquakes whose seismic waves are of sizes W and w , respectively. Using properties of logarithms, find a simplified formula for the difference $M - m$, in terms of W and w .

$$M - m = \underline{\hspace{2cm}}$$

(Enter $\log 10$ or \log_{10} for the base 10 logarithm.)

(b) The 1989 earthquake in California had a rating of 7.1 on the Richter scale. How many times larger were the seismic waves in the March 2005 earthquake off the coast of Sumatra, which measured 8.7 on the Richter scale?

14. (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".

$$\log_2(x+1) - \log_2(x-4) = 4.$$

$$x = \underline{\hspace{2cm}}$$

$$\log_2(x-4) - \log_2(x+1) = 4$$

$$x = \underline{\hspace{2cm}}$$

$$\log_2(x) + \log_2(x+1) = 4$$

$$x = \underline{\hspace{2cm}}$$

15. (1 pt) Find the doubling time for a city whose population is growing by 17% per year.

The doubling time is years.

16. (1 pt) Find the half-life of an element which decays at a rate of 3.407% per day.

The half-life is days.

17. (1 pt) Find a formula for the exponential function $V = h(t)$ that gives the value of an item initially worth \$5000 that loses half its value every 4 years.

$$h(t) = \underline{\hspace{2cm}} \text{ dollars.}$$

(Do not enter any commas in your formula.)

18. (1 pt)

You deposit \$1700 in an account with an annual interest rate of 14%.

How much will be in the account after 5 years if interest is compounded annually (once per year)?

 dollars

How much will be in the account after 5 years if interest is compounded quarterly (four times per year)?

 dollars

How much will be in the account after 5 years if interest is compounded monthly (12 times per year)?

 dollars

19. (1 pt)

You deposit \$2800 in an account with an annual interest rate of 11%. Answer the following questions, rounding your answers to the nearest hundredth of a year (e.g. 12.34 years).

How long will it take for your funds to triple if interest is compounded annually (once per year)?

 years

How long will it take for your funds to triple if interest is compounded quarterly (four times per year)?

 years

How long will it take for your funds to triple if interest is compounded monthly (12 times per year)?

 years

20. (1 pt) A bacteria colony initially contains 900 cells and doubles in size every 490 hours.

Assuming exponential growth, find a formula for the number of cells $p(t)$ in the colony after t hours.

$$p(t) = \underline{\hspace{2cm}} \text{ cells}$$

How long will it take for the colony to triple in size?

 hours

How long will it take for the colony to grow to 8000 cells?

 hours
