

Precalculus (23554) (Math 1) HW Set #7. Due in class on Wednesday, April 8th.

In order to receive a ✓, you must attempt all problems and write out all steps leading to your answers neatly and legibly. You cannot simply write the correct answer to demonstrate your mathematical understanding.

You must include your name, the course title and section number on the first page. All homework sets must be stapled. No late homework will be accepted without my express permission. You may receive a ✗ if these guidelines are not followed.

Good luck!

Find the exact value of the logarithmic expression.

1) $\log_2 8$ 1) _____

2) $\log_9 \frac{1}{729}$ 2) _____

3) $\log_{10} 1000$ 3) _____

Graph the function.

4) $f(x) = 2 - \ln(x + 4)$ 4) _____

Solve the equation.

5) $\log_5 (x + 1) = -2$ 5) _____

6) $\ln \sqrt{x + 8} = 7$ 6) _____

7) $e^{x+2} = 4$ 7) _____

The Richter scale converts seismographic readings into numbers for measuring the magnitude of an earthquake according to this function

$$M(x) = \log \left(\frac{x}{x_0} \right), \text{ where } x_0 = 10^{-3}.$$

8) What is the magnitude of an earthquake whose seismographic reading is 7.5 millimeters at a distance of 100 kilometers from its epicenter? Round the answer to the nearest tenth. 8) _____

Here's an application of logarithms for those studying chemistry.

9) $\text{pH} = -\log_{10} [\text{H}^+]$ Find the $[\text{H}^+]$ if the $\text{pH} = 7.4$. 9) _____

Write as the sum and/or difference of logarithms. Express powers as factors.

10) $\log_3 \left(\frac{x^2}{y^7} \right)$ 10) _____

11) $\ln \sqrt[5]{ey}$ 11) _____

$$12) \log_9 \frac{\sqrt[7]{r} \sqrt[4]{s}}{u^2}$$

12) _____

$$13) \ln \left(\frac{(x+9)(x-5)}{(x-2)^2} \right)^{3/4}, \quad x > 5$$

13) _____

$$14) \ln \frac{(2x) \sqrt[7]{1+3x}}{(x-8)^5}, \quad x > 8$$

14) _____

Express as a single logarithm.

$$15) (\log_a q - \log_a r) + 2 \log_a p$$

15) _____

$$16) 9 \log_c 5 + 7 \log_c 6$$

16) _____

$$17) 3 \log_a (2x+1) - 2 \log_a (2x-1) + 2$$

17) _____

Solve the equation.

$$18) \log (5+x) - \log (x-4) = \log 2$$

18) _____

$$19) \frac{1}{3} \log_2 (x+6) = \log_8 (3x)$$

19) _____

$$20) 2 + \log_3 (2x+5) - \log_3 x = 4$$

20) _____

$$21) \log_3 (x+2) + \log_3 (x-4) = 3$$

21) _____

$$22) 2^{(5+3x)} = \frac{1}{16}$$

22) _____

Solve the exponential equation. Express the solution set in terms of natural logarithms.

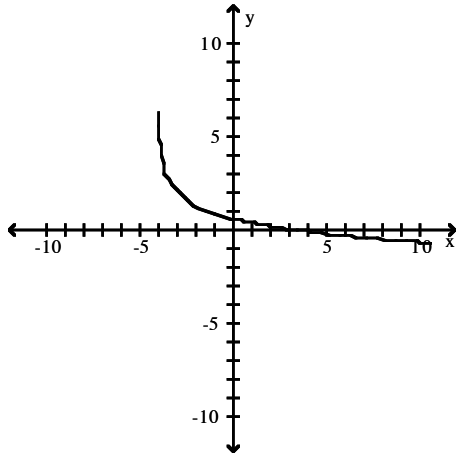
$$23) 4^{x+4} = 5^{2x+5}$$

23) _____

Answer Key

Testname: MATH_1_HW7

- 1) 3
- 2) -3
- 3) 3
- 4)



- 5) $\left\{-\frac{24}{25}\right\}$
- 6) $\{e^{14} - 8\}$
- 7) $\{\ln 4 - 2\}$
- 8) 3.9
- 9) 3.98×10^{-8}
- 10) $2 \log_3 x - 7 \log_3 y$
- 11) $\frac{1}{5} \ln y + \frac{1}{5}$
- 12) $\frac{1}{7} \log_9 r + \frac{1}{4} \log_9 s - 2 \log_9 u$
- 13) $\frac{3}{4} \ln (x+9) + \frac{3}{4} \ln (x-5) - \frac{3}{2} \ln (x-2)$
- 14) $\ln 2 + \ln x + \frac{1}{7} \ln (1+3x) - 5 \ln (x-8)$
- 15) $\log_a \frac{qp^2}{r}$
- 16) $\log_c 5^9 6^7$
- 17) $\log_a \frac{a^2(2x+1)^3}{(2x-1)^2}$
- 18) $\{13\}$
- 19) $\{3\}$
- 20) $\left\{\frac{5}{7}\right\}$
- 21) $\{7\}$
- 22) $\{-3\}$

Answer Key

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$$23) \left\{ \frac{5 \ln 5 - 4 \ln 4}{\ln 4 - 2 \ln 5} \right\}$$