
MATH 11010: Exam #4 (Fall 2012)

1. If \$16,275 is invested in an account paying $3\frac{5}{8}\%$ interest per year, compounded quarterly, how much will be in the account after 8 years? (Round answer to two decimal places.)
2. Suppose that 5,000 is invested today in an account paying $2\frac{1}{2}\%$ interest compounded continuously. How long will it take the investment to triple in value? (Round answer to two decimal places.)
3. Use the Laws of Logarithms to rewrite the expression in a form with no logarithm of a product, quotient, or power where possible. In other words, write the following expression in expanded form.

$$\ln \frac{\sqrt{5x-3}}{x^7(x^2+4)}$$

4. Rewrite the following expression as a single logarithm.

$$4 \log x - 2 [\log(x-2) - 5 \log(x+4)]$$

5. Find the domain of $y = \ln(7x+6)$
6. Find the inverse for $f(x) = \frac{8x-5}{7x}$
7. The half-life of a radioactive isotope is 27 years. Suppose we begin with a 40 g sample.
 - (a) Find the function that models the amount of material remaining after t years. (Round k to four decimal places.)
 - (b) After how long will only 8 g of the sample remain?
8. Solve for x . Give an exact answer and a decimal approximation, accurate to four decimal places.

$$5(3 + e^{-4x}) = 45$$

9. Solve for x . Give an exact answer and a decimal approximation, accurate to four decimal places.

$$4^{5x+3} = 7$$

10. Solve for x . Give an exact answer and a decimal approximation, accurate to four decimal places.

$$2e^{6x} - 13e^{3x} + 20 = 0$$

11. Solve for x . You must show all work. Exact answer(s) only.

$$\log_5(6x + 7) - \log_5(x - 3) = 2$$

12. Solve for x . You must show all work. Exact answer(s) only.

$$\log_7(2x - 1) + \log_7(x + 3) = \log_7 6x$$

13. Solve for x . You must show all work. Exact answer(s) only.

$$-6 + \log_2(x - 7) = 0$$

14. Evaluate. **Exact Answer Only.**

(a) $\log_{1/27} 3 =$

(b) $\log_7 343 =$

15. Rewrite each expression in exponential form.

(a) $\ln 6x = 2$

(b) $\log_4 7x = -5$

16. Rewrite each expression in logarithmic form.

(a) $\frac{1}{16}^{-1/2} = 4$

(b) $17 = e^y$

17. Sketch the graph of each function. You must include the horizontal asymptote and label one point on the graph.

(a) $f(x) = \left(\frac{2}{3}\right)^{x+2} + 4$

(b) $f(x) = 8^{x-3} - 2$

18. Given that $\log_a 3 \approx 0.792$, $\log_a 5 \approx 1.161$, $\log_a 7 \approx 1.404$, find

$$\log_a \frac{5}{63},$$

if possible. Round answer to three decimal places.

ANSWERS

1. \$21,721.97
2. 43.94 years
3. $\frac{1}{2} \ln(5x - 3) - 7 \ln x - \ln(x^2 + 4)$
4. $\log \frac{x^4(x+4)^{10}}{(x-2)^2}$
5. $x > -\frac{6}{7}$
6. $f^{-1}(x) = \frac{-5}{7x-8}$
7. (a) $A = 40e^{-0.0257t}$
(b) 62.62 years
8. $x = \frac{-\ln 6}{4} \approx -0.4479$
9. $x = \frac{\ln 7 - 3 \ln 4}{5 \ln 4} \approx -0.3193$
10. $x = \frac{\ln \frac{5}{2}}{3} \approx 0.3054$; $x = \frac{\ln 4}{3} \approx 0.4621$
11. $x = \frac{82}{19}$
12. $x = \frac{3}{2}$; (NOTE: $x = -1$ does not check)
13. $x = 71$
14. (a) $-\frac{1}{3}$ (b) 3
15. (a) $6x = e^2$ (b) $7x = 4^{-5}$
16. (a) $\log_{1/16} 4 = -\frac{1}{2}$
(b) $\ln 17 = y$
17. See instructor for answer.
18. -1.827