

Math 110
Exam III
Fall 2009

All Sections including Salt Lake Center

1. Express $f(x) = \log_4(2x - 4) + 4 \log_4(x) - \log_4(4x^2 - 9)$ as a single logarithm.

(a) $\log_4 \left(\frac{4x^2 - 9}{4x(2x - 4)} \right)$

(d) $\log_4 (x^4(2x - 4)(4x^2 - 9))$

(b) $\log_4 \left(\frac{4x(2x - 4)}{4x^2 - 9} \right)$

(e) $\log_4 \left(\frac{4x(2x - 4)}{4x^2 - 9} \right)$

(c) $\log_4 \left(\frac{x^4(2x - 4)}{4x^2 - 9} \right)$

(f) These logarithms cannot be combined further.

2. Which of the following is equal to $\ln 5$:

(a) $\ln 2 - \ln 10$

(d) $\ln 2 * \ln 10$

(b) $\ln 2 + \ln 10$

(e) $2 \ln 2 + 2 \ln 10$

(c) $\ln 10 - \ln 2$

(f) None of these.

3. How many years would it take for \$5000 to double if it is invested at a rate of 10% compounded continuously?

(a) $2 \ln 10$

(d) $5 \ln 2$

(b) $5 \ln \frac{1}{2}$

(e) $10 \ln 2$

(c) $10 \ln \frac{1}{2}$

(f) $2 \ln 5$

4. Radioactive Uranium decays according to the formula: $A(t) = 400e^{-0.457t}$, where time is measured in years. What is the half-life of Uranium in years?

(a) $\ln \frac{1}{2}$

(e) $\ln 2 * (0.457)$

(b) $\frac{0.457}{\ln 2}$

(f) There is not enough information to determine the half-life.

(c) -0.457

(d) $\frac{\ln 2}{0.457}$

5. Use the properties of logarithms to find the exact value of the expression $\log_2 24 - \log_2 6$.

(a) 0

(e) 4

(b) 1

(f) -2

(c) -1

(g) 2

(d) -4

(h) 144

6. Solve the equation $3^{(4-7x)} = \frac{1}{9}$.

(a) $\frac{7}{2}$

(e) $\frac{-2}{7}$

(b) $\frac{2}{7}$

(f) $\frac{-2}{9}$

(c) $\frac{9}{2}$

(g) $\frac{6}{7}$

(d) $\frac{2}{9}$

(h) $\frac{-6}{7}$

7. The function $f(x) = \frac{12}{2x-1}$ is one-to-one. Find its inverse.

(a) $f^{-1}(x) = \frac{2x-12}{x}$

(d) $f^{-1}(x) = \frac{2x}{12+x}$

(b) $f^{-1}(x) = \frac{2x+12}{x}$

(e) $f^{-1}(x) = \frac{12+x}{2x}$

(c) $f^{-1}(x) = \frac{2x}{12-x}$

(f) $f^{-1}(x) = \frac{12-x}{2x}$

8. Use the properties of logarithms to find the exact value of the expression $\log_5 8 \log_2 25$.

(a) 8

(e) 6

(b) 3

(f) 9

(c) 2

(g) 15

(d) 4

(h) 16

9. Let $f(x) = x^2 + 5x + 7$ and $g(x) = x + a$. There are two values of a for which the graph of $(f \circ g)(x)$ crosses the y -axis at 3. Find the sum of the two values.

(a) 1

(f) -3

(b) -1

(g) 4

(c) 2

(h) -4

(d) -2

(i) 5

(e) 3

(j) -5

10. If $f(x) = \frac{5x+1}{2x-4}$, find the range of f .

(a) Range of $f = \{y|y \neq \frac{5}{2}\}$

(b) Range of $f = \{y|y \neq \frac{-5}{2}\}$

(c) Range of $f = \{y|y \neq \frac{-1}{4}\}$

(d) Range of $f = \{y|y \neq \frac{-1}{2}\}$

(e) Range of $f = \{y|y \neq \frac{1}{2}\}$

(f) The range is all real numbers.

11. Solve the equation $5^{(3-4x)} = 4^{(2x)}$

(a) $\frac{3 \ln 5 + 4 \ln 5}{2 \ln 4}$

(e) $\frac{2 \ln 4 + 4 \ln 5}{3 \ln 5}$

(b) $\frac{3 \ln 5}{2 \ln 4 + 4 \ln 5}$

(f) $3 \ln(5) - 2 \ln 4$

(c) $\frac{4 \ln 2 + 4 \ln 5}{5 \ln 3}$

(g) $5 \ln(3) + 4 \ln 3$

(d) $\frac{5 \ln 3}{4 \ln 2 + 5 \ln 4}$

12. If \$1000 is invested at a rate of 12% interest compounded monthly, then the amount in dollars after 4 years is:

(a) $1000(1.12)^{48}$

(e) $1000(1.12)^4$

(b) $1000(1.01)^{48}$

(f) $1000(1.04)^{12}$

(c) $1000(1.01)^{12}$

(g) $1000(1.01)^4$

(d) $1000(1.04)^4$

(h) $1000(1.12)^{12}$

13. Find the vertex of the parabola: $y = 4x^2 + 8x + 10$.

(a) (-1,-10)

(d) (1,-6)

(b) (-1,10)

(e) (1,10)

(c) (-1,6)

(f) (1,-10)

14. Find the domain of the composite function $f \circ g$ where $f(x) = \frac{5}{x-7}$ and $g(x) = 7x$.

(a) $\{x|x \neq 0, x \neq 7\}$

(d) $\{x|x \neq 0, x \neq -1\}$

(b) $\{x|x \neq 1\}$

(e) $\{x|x \neq 0, x \neq -1, x \neq 7\}$

(c) $\{x|x \neq 0, x \neq 1\}$

(f) $\{x|x \neq 0, x \neq 1, x \neq 7\}$

15. Find the focus of the parabola $(y - 3)^2 = 4(x + 2)$.

(a) Focus: (-2,2)

(d) Focus: (3,-3)

(b) Focus: (4,-2)

(e) Focus: (2,-2)

(c) Focus: (2,-4)

(f) Focus: (-1,3)

16. Solve the equation $\log_3(x^2 - x + 7) = 2$ for x .

(a) $x = -2$ or 1

(d) $x = 0$

(b) $x = 2$ or -1

(e) $x = 3$ or 1

(c) $x = -1$ or 1

(f) $x = -3$ or -1

17. Solve the equation $(2^x)^2 - 3(2^x) + 2 = 0$.

(a) $x = 0$ or 1

(b) $x = 0$ or -1

(c) $x = 2$ or 1

(d) $x = 2$ or -1

(e) $x = -2$ or -1

(f) $x = 0$

(g) There is no solution.

18. Find the domain of $f(x) = \ln\left(\frac{x^2-9}{x-2}\right)$

(a) $(-3, 2) \cup (3, \infty)$

(b) $(-\infty, -3) \cup (2, 3)$

(c) $(-3, 2) \cup (2, 3)$

(d) $(-3, 3)$

(e) $(-\infty, -3) \cup (3, \infty)$

(f) $(-2, 3)$

(g) The domain is all real numbers.

19. Find the equation of the parabola with focus at $(-2, 1)$ and directrix $x = 8$.

(a) $(y - 3)^2 = -5(x - 1)$

(b) $(y - 1)^2 = -5(x - 3)$

(c) $(x - 3)^2 = -20(y - 1)$

(d) $(x - 1)^2 = -20(y - 3)$

(e) $(y - 3)^2 = -20(x - 1)$

(f) $(y - 1)^2 = -20(x - 3)$

(g) $(x - 1)^2 = -5(y - 3)$

(h) $(y - 3)^2 = 20(x - 1)$

(i) $(y - 1)^2 = 20(x - 3)$

20. Solve $f(x) = (\sqrt{3})^{(14x-24)} = 3^{x^2}$ for x .

(a) $x = -3$ or 4

(b) $x = 3$ or 4

(c) $x = 0$

(d) $x = -1$ or 1

(e) $x = 6$ or 8

(f) $x = -6$ or -8

(g) $x = -3$ or -4

(h) There is no solution

1c
2c
3e
4d
5g
6g
7e
8e
9j
10a
11b
12b
13c
14b
15f
16b
17a
18a
19f
20b