

FALL 2013 MATH 1314 REVIEW EXAM 4

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Evaluate the logarithm.

1) $\log_9 \frac{1}{81}$ 1) _____

- A) -9 B) 2 C) 9 D) -2

2) $\log_2 \frac{1}{2}$ 2) _____

- A) 2 B) -1 C) 0 D) 1

3) $\log_5 5$ 3) _____

- A) 5 B) 1 C) 10 D) 0

4) $\log_{20} 1$ 4) _____

- A) 20 B) 1 C) 10 D) 0

5) $\log_{20} (-1)$ 5) _____

- A) -1 B) 1 C) 0 D) Undefined

Write in logarithmic form.

6) $2^{-3} = \frac{1}{8}$ 6) _____

- A) $\log_2 -3 = \frac{1}{8}$ B) $\log_2 \frac{1}{8} = -3$ C) $\log_{-3} \frac{1}{8} = 2$ D) $\log_{1/8} 2 = -3$

7) $\left(\frac{4}{11}\right)^{-3} = \frac{1331}{64}$ 7) _____

- A) $\frac{\log_3 4^{-3}}{\log_3 11^{-3}} = \frac{11}{4}$ B) $\log_3 \frac{4}{11} = \frac{4-3}{11-3}$
C) $\log_{4/11} \left(\frac{1331}{64}\right) = -3$ D) $\log_{-3} \left(\frac{11-3}{4-3}\right) = \frac{11}{4}$

Write an equivalent expression in exponential form.

8) $\log_{10} 0.0001 = -4$ 8) _____

- A) $10^{-4} = 0.0001$ B) $-4^{10} = 0.0001$ C) $0.0001^{-4} = 10$ D) $10^{0.0001} = -4$

Solve the equation.

9) $\log_9 \frac{1}{729} = x$ 9) _____

- A) $\left\{\frac{1}{6561}\right\}$ B) $\{3\}$ C) $\left\{\frac{1}{81}\right\}$ D) $\{-3\}$

10) $\log_6 \sqrt{610} = x$

A) $\{30\}$

B) $\{5\}$

C) $\{60\}$

D) $\{\sqrt{5}\}$

10) _____

11) $x = \log_3 \sqrt[3]{81}$

A) $\{12\}$

B) $\left\{\frac{4}{3}\right\}$

C) $\left\{-\frac{4}{3}\right\}$

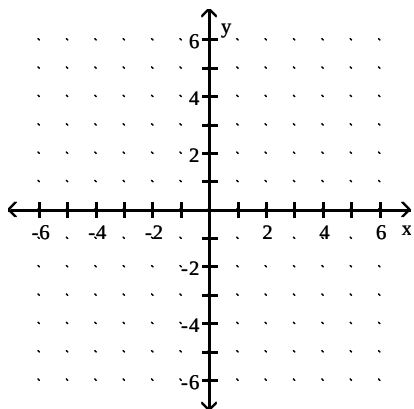
D) $\left\{\frac{3}{4}\right\}$

11) _____

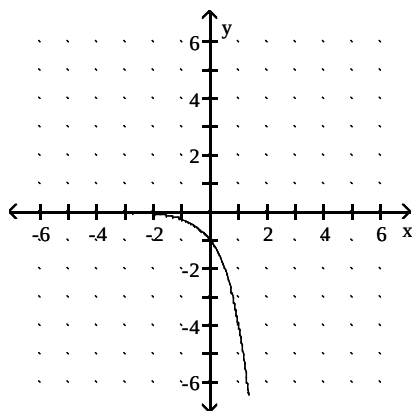
Graph the function.

12) $f(x) = \log_4 x$

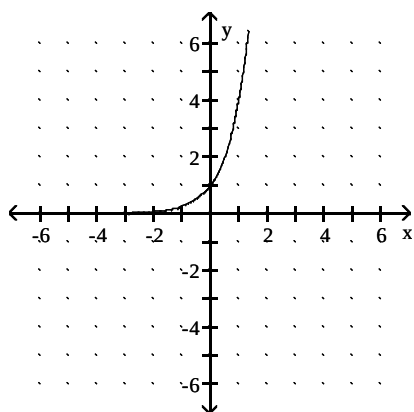
12) _____



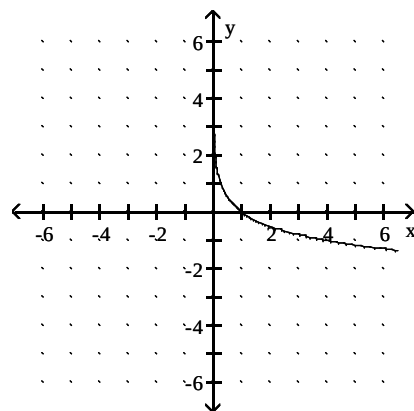
A)



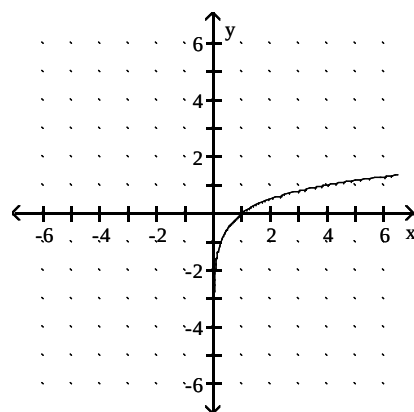
C)



B)

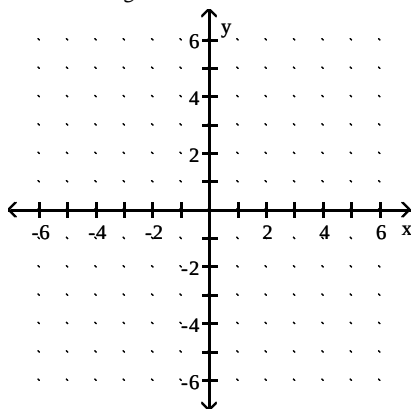


D)

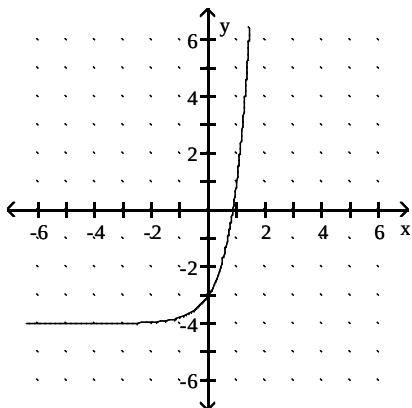


13) $f(x) = \log_5 (x - 4)$

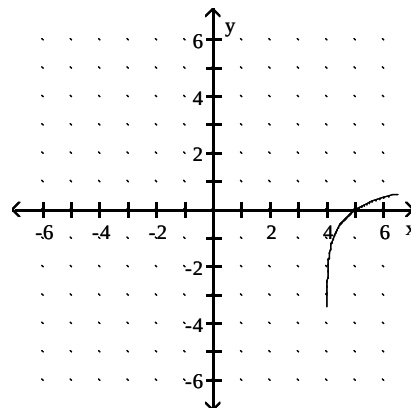
13) _____



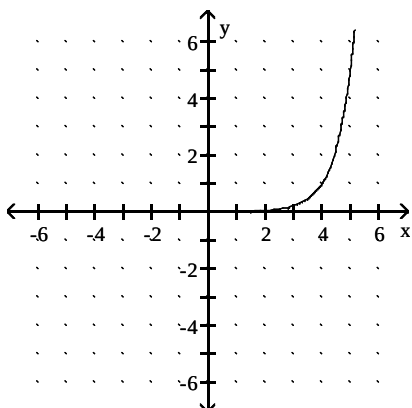
A)



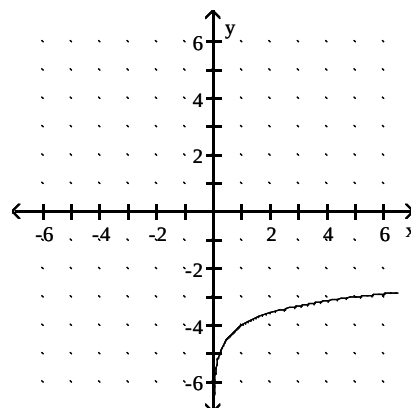
B)



C)



D)



Write the expression as a sum, difference, or product of logarithms. Assume that all variables represent positive real numbers.

14) $\log_a(4x^2y)$

14) _____

A) $\log_a(4 + x^2 + y)$

B) $(\log_a 4)(\log_a x)(\log_a y)$

C) $\log_a 4 + 2\log_a x + \log_a y$

D) $\log_a 4 + (\log_a x)^2 + \log_a y$

$$15) \log_6 \left(\frac{\sqrt{13}}{9} \right)$$

15) _____

A) $\frac{1}{2} \log_6 13 - \log_6 9$

B) $\sqrt{\log_6 13} - \log_6 9$

C) $\frac{\frac{1}{2} \log_6 13}{\log_6 9}$

D) $\log_6 \sqrt{13} + \log_6 9$

$$16) \log_{13} \left(\frac{19m}{y} \right)$$

16) _____

A) $(\log_{13} 19)(\log_{13} m) - \log_{13} y$

B) $\log_{13} 19 - \log_{13} m - \log_{13} y$

C) $\frac{\log_{13} 19 + \log_{13} m}{\log_{13} y}$

D) $\log_{13} 19 + \log_{13} m - \log_{13} y$

$$17) \log_{19} \left(\frac{4\sqrt{m}}{n} \right)$$

17) _____

A) $\log_{19} 4 + \frac{1}{2} \log_{19} m - \log_{19} n$

B) $\log_{19} 4 \cdot \left(\frac{1}{2} \log_{19} m \right) \div \log_{19} n$

C) $\log_{19} n - \log_{19} 4 - \frac{1}{2} \log_{19} m$

D) $\log_{19} 4 + \sqrt{\log_{19} m} - \log_{19} n$

Use the product, quotient, and power rules of logarithms to rewrite the expression as a single logarithm. Assume that all variables represent positive real numbers.

$$18) \log_4 13 - \log_4 a$$

18) _____

A) $\log_4 \left(\frac{a}{13} \right)$

B) $\log_4 (13 - a)$

C) $\log_8 \left(\frac{13}{a} \right)$

D) $\log_4 \left(\frac{13}{a} \right)$

$$19) (\log_a m - \log_a n) + 4 \log_a k$$

19) _____

A) $\log_a (m + k^4 - n)$

B) $\log_a \left(\frac{mk^4}{n} \right)$

C) $\log_a \left(\frac{4mk}{n} \right)$

D) $\log_a \left(\frac{m}{k^4 n} \right)$

Use a calculator to find the logarithm. Give an approximation to four decimal places.

$$20) \log 2.14$$

20) _____

A) .3502

B) .3304

C) .7608

D) .3096

$$21) \ln .000356$$

21) _____

A) -7.9406

B) -3.4486

C) 3.4486

D) 7.9406

Solve the equation. If necessary, round to the nearest thousandth.

22) $2(x - 2) = 20$

A) $\{2.322\}$

B) $\{6.322\}$

C) $\{4.303\}$

D) $\{12.000\}$

22) _____

Solve the equation and express the solution in exact form.

23) $\ln(18x + 3) = \ln 11$

A) $\left\{\frac{7}{18}\right\}$

B) $\left\{-\frac{4}{9}\right\}$

C) $\left\{\frac{7}{9}\right\}$

D) $\left\{\frac{4}{9}\right\}$

23) _____

24) $\log(x - 3) = 1 - \log x$

A) $\{-5, 2\}$

B) $\{5\}$

C) $\{-5\}$

D) $\{-2, 5\}$

24) _____

25) $\ln(6x - 5) + \ln(x - 1) = \ln 5$

A) $\emptyset$

B) $\left\{\frac{11}{6}\right\}$

C) $\left\{1, \frac{1}{6}\right\}$

D) $\left\{0, \frac{11}{6}\right\}$

25) _____

Solve the system by substitution.

26) $x + 3y = -21$

$2x + 3y = -24$

A) $\emptyset$

B) $\{(3, -7)\}$

C) $\{(-2, -3)\}$

D) $\{(-3, -6)\}$

26) _____

Solve the system by elimination.

27) $-7x - 7y = 42$

$-5x + 4y = 30$

A) $\emptyset$

B) $\{(-6, 0)\}$

C) $\{(-6, 1)\}$

D) $\{(-7, 1)\}$

27) _____

Solve the nonlinear system of equations.

28) $x^2 + y^2 = 13$

$x - y = 1$

A) $\{(2, -3), (3, -2)\}$

B) $\{(2, 3), (3, 2)\}$

C) $\{(-2, 3), (-3, 2)\}$

D) $\{(-2, -3), (3, 2)\}$

28) _____

29) $x^2 + y^2 = 68$

$x^2 - y^2 = -60$

A) $\{(2, 8), (8, 2), (-2, -8), (-8, -2)\}$

B) $\{(2, -8), (2, 8)\}$

C) $\{(2, 8), (-2, 8), (2, -8), (-2, -8)\}$

D) $\{(-2, -8), (-8, -2)\}$

29) _____

Determine the value of each variable.

30) $\begin{bmatrix} x+3 & y+4 \\ 7 & -4 \end{bmatrix} = \begin{bmatrix} 8 & -4 \\ 7 & k \end{bmatrix}$

A) $x = 5; y = -8; k = -4$

B) $x = 8; y = -4; k = -4$

C) $x = 5; y = -4; k = 8$

D) $x = -5; y = 8; k = 4$

30) _____

Find the size of the matrix.

31) $\begin{bmatrix} 6 & 8 & -2 \\ 6 & -1 & -8 \end{bmatrix}$

A) 6

B) 2×3

C) 6, 8, -2, 6, -1, -8

D) 3×2

31) _____

32) $\begin{bmatrix} -7 & -9 & -2 & 9 & -3 \\ 1 & 8 & 7 & -2 & -9 \\ 2 & 5 & 9 & 7 & -9 \end{bmatrix}$ 32) _____
 A) 3×5 B) $-7, -9, -2, 9, -3, 1, 2$
 C) 5×3 D) 15

Perform the indicated operation or operations, if possible.

33) $\begin{bmatrix} -5 & 1 \\ 2 & 5 \end{bmatrix} + \begin{bmatrix} 6 & 2 \\ 3 & 2 \end{bmatrix}$ 33) _____
 A) $\begin{bmatrix} 1 & -3 \\ -2 & -3 \end{bmatrix}$ B) $\begin{bmatrix} 3 & 4 \\ 3 & 7 \end{bmatrix}$ C) $\begin{bmatrix} 16 \end{bmatrix}$ D) $\begin{bmatrix} 1 & 3 \\ 5 & 7 \end{bmatrix}$

34) $\begin{bmatrix} -1 & 0 \\ 3 & 3 \end{bmatrix} - \begin{bmatrix} -1 & 3 \\ 3 & 1 \end{bmatrix}$ 34) _____
 A) $\begin{bmatrix} 0 & 3 \\ 0 & -2 \end{bmatrix}$ B) $\begin{bmatrix} -2 & 3 \\ 6 & 4 \end{bmatrix}$ C) $\begin{bmatrix} 0 & -3 \\ 0 & 2 \end{bmatrix}$ D) $\begin{bmatrix} -1 \end{bmatrix}$

Find the indicated matrix.

35) Let $A = \begin{bmatrix} 3 & 3 \\ 2 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 4 \\ -1 & 6 \end{bmatrix}$. Find $2A + B$. 35) _____
 A) $\begin{bmatrix} 6 & 14 \\ 2 & 20 \end{bmatrix}$ B) $\begin{bmatrix} 6 & 10 \\ 3 & 14 \end{bmatrix}$ C) $\begin{bmatrix} 6 & 10 \\ 1 & 10 \end{bmatrix}$ D) $\begin{bmatrix} 6 & 7 \\ 3 & 10 \end{bmatrix}$

The sizes of two matrices are given. Find the size of the product AB and the size of the product BA , if possible.

36) A is 3×3 ; B is 3×3 . 36) _____
 A) AB is 6×3 ; BA is 6×3 .
 B) AB is 3×3 ; BA is 3×3 .
 C) AB is 1×1 ; BA is 1×1 .
 D) AB is 3×6 ; BA is 3×6 .

37) A is 2×1 ; B is 1×1 . 37) _____
 A) AB is 2×2 ; BA is 1×1 .
 B) AB is 1×2 ; BA is 1×1 .
 C) AB cannot be calculated; BA is 1×2 .
 D) AB is 2×1 ; BA cannot be calculated.

Find the matrix product, if possible.

38) $\begin{bmatrix} 1 & 3 & -1 \\ 4 & 0 & 5 \end{bmatrix} \begin{bmatrix} 3 & 0 \\ -1 & 1 \\ 0 & 5 \end{bmatrix}$ 38) _____
 A) $\begin{bmatrix} 0 & -2 \\ 12 & 25 \end{bmatrix}$ B) Not possible C) $\begin{bmatrix} 3 & 4 & 0 \\ 0 & 0 & 25 \end{bmatrix}$ D) $\begin{bmatrix} -2 & 0 \\ 25 & -12 \end{bmatrix}$

Find the determinant of the given matrix.

39) $\begin{bmatrix} -5 & 4 \\ 9 & -3 \end{bmatrix}$ 39) _____
 A) -21 B) 21 C) 7 D) 51

$$40) \begin{bmatrix} a & b \\ b & a \end{bmatrix}$$

A) $2ab$

B) $a^2 + b^2$

C) 0

D) $a^2 - b^2$

40) _____

Answer Key

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- 1) D
- 2) B
- 3) B
- 4) D
- 5) D
- 6) B
- 7) C
- 8) A
- 9) D
- 10) B
- 11) B
- 12) D
- 13) B
- 14) C
- 15) A
- 16) D
- 17) A
- 18) D
- 19) B
- 20) B
- 21) A
- 22) B
- 23) D
- 24) B
- 25) B
- 26) D
- 27) B
- 28) D
- 29) C
- 30) A
- 31) B
- 32) A
- 33) D
- 34) C
- 35) B
- 36) B
- 37) D
- 38) A
- 39) A
- 40) D