

Name \_\_\_\_\_

**Find the function value. If the result is irrational, round your answer to the nearest thousandth.**

1) Let  $f(x) = \left(\frac{1}{3}\right)^x$ . Find  $f(-3)$ .

A)  $\frac{1}{27}$

B) 27

C)  $-\frac{1}{27}$

D) -9

**Solve the equation.**

2)  $\left(\frac{1}{7}\right)^x = 49$

A)  $\{-2\}$

B)  $\left\{-\frac{1}{2}\right\}$

C)  $\left\{\frac{1}{2}\right\}$

D)  $\{2\}$

3)  $2(5 - 3x) = \frac{1}{16}$

A)  $\{8\}$

B)  $\{-3\}$

C)  $\{3\}$

D)  $\left\{\frac{1}{8}\right\}$

**Use a calculator to estimate the solution set of the equation. Round to the nearest hundredth.**

4)  $3(4x - 1) = 14$

A)  $\{0.35\}$

B)  $\{0.85\}$

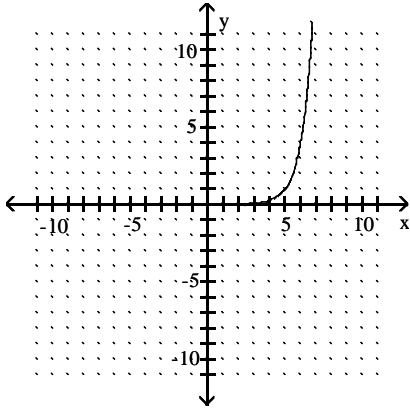
C)  $\{0.62\}$

D)  $\{1.42\}$

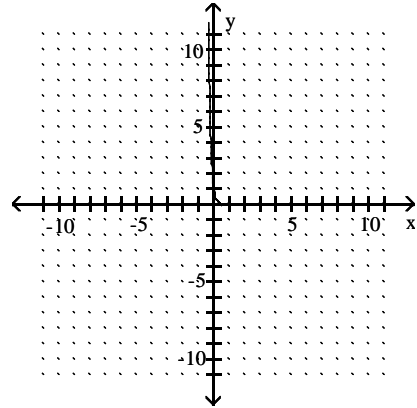
Graph the exponential function using transformations where appropriate.

5)  $f(x) = 4^x + 5$

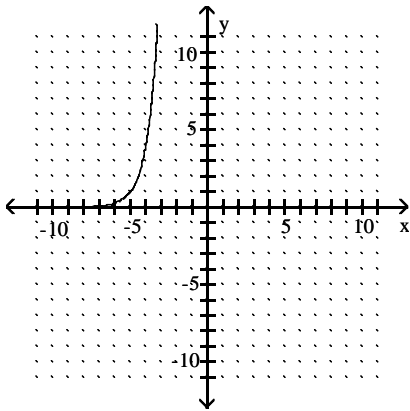
A)



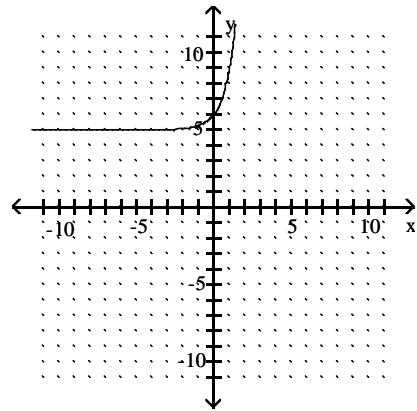
B)



C)



D)



Evaluate the logarithm.

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

A) -1

B) 2

C) 1

D) 0

7)  $\log_2 \sqrt{2}$

A)  $\frac{1}{2}$

B) -2

C) 2

D)  $-\frac{1}{2}$

8)  $\log_{20} 1$

A) 1

B) 0

C) 10

D) 20

9)  $\log_{10} 1,000,000$

A) -6

B) 1,000,000

C) 6

D) 6,000,000

10)  $\log_{20}(-1)$

A) Undefined

B) 0

C) -1

D) 1

**Solve the equation.**

11)  $\log_9 \frac{1}{729} = x$

A)  $\left\{ \frac{1}{81} \right\}$

B)  $\left\{ \frac{1}{6561} \right\}$

C)  $\{-3\}$

D)  $\{3\}$

12)  $\log_x 8 = 3$

A)  $\{2\}$

B)  $\{11\}$

C)  $\{3\}$

D)  $\{24\}$

13)  $\log_5 x = -2$

A)  $\left\{ \frac{1}{32} \right\}$

B)  $\left\{ \frac{1}{25} \right\}$

C)  $\{-10\}$

D)  $\{3\}$

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

14)  $\log_b \left( \frac{m^5 p^3}{n^4 b^8} \right)$

A)  $5\log_b m + 3\log_b p - 4\log_b n + 8$

B)  $\log_b m^5 + \log_b p^3 + \log_b n^4 - \log_b b^8$

C)  $m^5 p^3 - n^4 b^8$

D)  $5\log_b m + 3\log_b p - 4\log_b n - 8$

**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.**

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

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

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

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

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

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

16)  $\log 174$

A) 2.2405

B) 2.2380

C) 2.2430

D) 5.1591

**Use the change of base rule to find the logarithm to four decimal places.**

17)  $\log_8 5$

A) 1.5480

B) -0.7740

C) 0.7740

D) 1.2920

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

18)  $5(2x - 1) = 10$

A)  $\{1.500\}$

B)  $\{1.215\}$

C)  $\{0.847\}$

D)  $\{0.215\}$

**Solve the equation and express the solution in exact form.**

19)  $\log_9 (x - 7) + \log_9 (x - 7) = 1$

- A)  $\{-\sqrt{50}, \sqrt{50}\}$       B)  $\{10\}$       C)  $\{-10, 10\}$       D)  $\{\sqrt{50}\}$

**Solve the problem.**

20) Assume the cost of a gallon of milk is \$2.50. With continuous compounding, find the time it would take the cost to be 2 times as much (to the nearest tenth of a year), at an annual inflation rate of 6%.

- A) 0.1 years      B) 11.6 years      C) 0.2 years      D) 4.2 years

**Solve the system by substitution.**

21)  $x - 3y = 1$

$x = 4y$

- A)  $\left\{\left\{\frac{3}{7}, \frac{1}{7}\right\}\right\}$       B)  $\{(4, 1)\}$       C)  $\{(1, 4)\}$       D)  $\{(-4, -1)\}$

**Solve the system by elimination.**

22)  $-5x - 6y = -47$

$2x + 2y = 18$

- A)  $\{(6, 3)\}$       B)  $\emptyset$       C)  $\{(7, 3)\}$       D)  $\{(7, 2)\}$

**Solve the system. If the system has infinitely many solutions, give the solution in terms of the arbitrary variable x.**

23)  $9x - y = 4$

$-18x + 2y = -8$

- A)  $\{(x, 4 - 9x)\}$       B)  $\emptyset$       C)  $\{(x, 18x - 4)\}$       D)  $\{(x, 9x - 4)\}$

**Find the determinant of the given matrix.**

24)  $\begin{bmatrix} -1 & 2 \\ 2 & 3 \end{bmatrix}$

- A) 1      B) 7      C) -8      D) -7

**Evaluate the determinant.**

25)  $\begin{vmatrix} 3 & 3 & 2 \\ 1 & 5 & 1 \\ 1 & 5 & 5 \end{vmatrix}$

- A) 128      B) 42      C) -48      D) 48

**Solve the nonlinear system of equations.**

26)  $x^2 + y^2 = 5$

$x + y = 3$

- A)  $\{(2, 1), (1, 2)\}$       B)  $\{(2, -1), (1, -2)\}$       C)  $\{(-2, -1), (-1, -2)\}$       D)  $\{(-2, 1), (-1, 2)\}$

27)  $x^2 - 3y^2 = 1$   
 $4x^2 + 3y^2 = 19$

- A)  $\{(2, 1), (-2, -1)\}$   
 C)  $\{(-1, 2), (1, -2)\}$

- B)  $\{(1, 2), (-1, 2), (1, -2), (-1, -2)\}$   
 D)  $\{(2, 1), (2, -1), (-2, 1), (-2, -1)\}$

**Determine the value of each variable.**

28)  $\begin{bmatrix} 0 & 0 \\ a & b \end{bmatrix} = \begin{bmatrix} 0 & q \\ 8 & -9 \end{bmatrix}$

- A)  $a = 0; b = 0; q = 0$       B)  $a = -9; b = 8; q = 0$       C)  $a = -8; b = 9; q = 0$       D)  $a = 8; b = -9; q = 0$

**Find the size of the matrix.**

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

- A) 6, 8, -2, 6, -1, -8      B)  $2 \times 3$       C) 6      D)  $3 \times 2$

**Perform the indicated operation or operations, if possible.**

30)  $\begin{bmatrix} -1 & 0 \\ 3 & 3 \end{bmatrix} - \begin{bmatrix} -1 & 3 \\ 3 & 1 \end{bmatrix}$

- A)  $\begin{bmatrix} 0 & 3 \\ 0 & -2 \end{bmatrix}$       B)  $\begin{bmatrix} 0 & -3 \\ 0 & 2 \end{bmatrix}$       C)  $\begin{bmatrix} -2 & 3 \\ 0 & 4 \end{bmatrix}$       D)  $[-1]$

**Find the indicated matrix.**

31) Let  $A = \begin{bmatrix} -3 & 2 \\ 0 & 2 \end{bmatrix}$ . Find  $3A$ .

- A)  $\begin{bmatrix} -9 & 6 \\ 0 & 2 \end{bmatrix}$       B)  $\begin{bmatrix} 0 & 5 \\ 3 & 5 \end{bmatrix}$       C)  $\begin{bmatrix} -9 & 6 \\ 0 & 6 \end{bmatrix}$       D)  $\begin{bmatrix} -9 & 2 \\ 0 & 2 \end{bmatrix}$

32) Let  $A = \begin{bmatrix} 3 & 3 \\ 2 & 4 \end{bmatrix}$  and  $B = \begin{bmatrix} 0 & 4 \\ -1 & 6 \end{bmatrix}$ . Find  $2A + B$ .

- A)  $\begin{bmatrix} 6 & 10 \\ 1 & 10 \end{bmatrix}$       B)  $\begin{bmatrix} 6 & 10 \\ 3 & 14 \end{bmatrix}$       C)  $\begin{bmatrix} 6 & 14 \\ 2 & 20 \end{bmatrix}$       D)  $\begin{bmatrix} 6 & 7 \\ 3 & 10 \end{bmatrix}$

**Find the matrix product, if possible.**

33)  $\begin{bmatrix} 1 & 3 & -1 \\ 4 & 0 & 5 \end{bmatrix} \begin{bmatrix} 3 & 0 \\ -1 & 1 \\ 0 & 5 \end{bmatrix}$

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

## Answer Key

Testname: M1314 REVIEW 4

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