

SUMMER 1 2016 MATH 1314 EXAM 4 REVIEW

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

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

1) $\log_a(4x^2y)$ 1) _____

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

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

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

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

2) $\log_6 \left(\frac{\sqrt{13}}{9} \right)$ 2) _____

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

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

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

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

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

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

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

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.

4) $6 \log_a q - \log_a r$ 4) _____

A) $\log_a \left(\frac{6q}{r} \right)$

B) $\log_a q^6 \div \log_a r$

C) $\log_a \left(\frac{q^6}{r} \right)$

D) $\log_a (q^6 - r)$

Solve the equation and express the solution in exact form.

5) $\ln(18x + 3) = \ln 11$ 5) _____

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

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

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

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

6) $\log(x - 3) = 1 - \log x$ 6) _____

A) $\{5\}$

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

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

D) $\{-5\}$

7) $\log 4x = \log 5 + \log(x + 1)$ 7) _____

A) $\{-5\}$

B) $\left\{ \frac{5}{9} \right\}$

C) $\{2\}$

D) $\{5\}$

Solve the system by elimination.

8) $x + 6y = -2$ 8) _____

$-3x + 7y = 6$

A) $\{(-2, 0)\}$

B) $\emptyset$

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

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

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

$$\begin{aligned} 9) \quad & 10x - 9y = 1 \\ & -20x + 18y = 1 \end{aligned}$$

9) _____

A) $\emptyset$

B) $\left\{ \left\{ x, \frac{2}{9} + \frac{10}{9}x \right\} \right\}$

C) $\left\{ \left\{ -\frac{1}{12}, \frac{11}{54} \right\} \right\}$

D) $\left\{ \left\{ x, \frac{1}{12}x \right\} \right\}$

Solve the following system.

$$10) \quad \frac{3}{x} + \frac{1}{y} = -\frac{1}{8}$$

10) _____

$$\frac{-1}{x} - \frac{1}{y} = \frac{3}{8}$$

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

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

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

D) $\{(-1, 3)\}$

Find the determinant of the given matrix.

$$11) \begin{bmatrix} -5 & 4 \\ 9 & -3 \end{bmatrix}$$

11) _____

A) 21

B) 7

C) -21

D) 51

$$12) \begin{bmatrix} a & b \\ b & a \end{bmatrix}$$

12) _____

A) 0

B) 2ab

C) $a^2 - b^2$

D) $a^2 + b^2$

Solve the nonlinear system of equations.

$$13) \quad \begin{aligned} & x^2 + y^2 = 5 \\ & x + y = 3 \end{aligned}$$

13) _____

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

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

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

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

$$14) \quad \begin{aligned} & x^2 - 3y^2 = 1 \\ & 4x^2 + 3y^2 = 19 \end{aligned}$$

14) _____

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

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

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

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

Find the size of the matrix.

$$15) \begin{bmatrix} -7 & -9 & -2 & 9 & -3 \\ 1 & 8 & 7 & -2 & -9 \\ 2 & 5 & 9 & 7 & -9 \end{bmatrix}$$

15) _____

A) 15

B) 3×5

C) -7, -9, -2, 9, -3, 1, 2

D) 5×3

$$16) \begin{bmatrix} 6 & 9 & -5 \end{bmatrix}$$

16) _____

A) 3×1

B) 6, 9, -5

C) 1×3

D) 3

Determine the value of each variable.

$$17) \begin{bmatrix} x+3 & y+4 \\ 7 & -4 \end{bmatrix} = \begin{bmatrix} 8 & -4 \\ 7 & k \end{bmatrix}$$

17) _____

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

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

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

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

Perform the indicated operation or operations, if possible.

18) $\begin{bmatrix} -5 & 1 \\ 2 & 5 \end{bmatrix} + \begin{bmatrix} 6 & 2 \\ 3 & 2 \end{bmatrix}$

18) _____

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

B) $\begin{bmatrix} 16 \end{bmatrix}$

C) $\begin{bmatrix} 1 & 3 \\ 5 & 7 \end{bmatrix}$

D) $\begin{bmatrix} 3 & 4 \\ 3 & 7 \end{bmatrix}$

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

19) _____

A) $\begin{bmatrix} -2 & 3 \\ 6 & 4 \end{bmatrix}$

B) $\begin{bmatrix} 0 & 3 \\ 0 & -2 \end{bmatrix}$

C) $\begin{bmatrix} -1 \end{bmatrix}$

D) $\begin{bmatrix} 0 & -3 \\ 0 & 2 \end{bmatrix}$

Find the indicated matrix.

20) Let $C = \begin{bmatrix} 1 \\ -3 \\ 2 \end{bmatrix}$ and $D = \begin{bmatrix} -1 \\ 3 \\ 2 \end{bmatrix}$. Find $C - 2D$.

20) _____

A) $\begin{bmatrix} 3 \\ -9 \\ -2 \end{bmatrix}$

B) $\begin{bmatrix} 3 \\ -6 \\ 4 \end{bmatrix}$

C) $\begin{bmatrix} -3 \\ 9 \\ 2 \end{bmatrix}$

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

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

21) _____

A) $\begin{bmatrix} 6 & 14 \\ 2 & 20 \end{bmatrix}$

B) $\begin{bmatrix} 6 & 10 \\ 1 & 10 \end{bmatrix}$

C) $\begin{bmatrix} 6 & 10 \\ 3 & 14 \end{bmatrix}$

D) $\begin{bmatrix} 6 & 7 \\ 3 & 10 \end{bmatrix}$

Find the matrix product, if possible.

22) $\begin{bmatrix} -2 & 3 \\ 4 & 2 \end{bmatrix} \begin{bmatrix} -2 & 0 \\ -1 & 4 \end{bmatrix}$

22) _____

A) $\begin{bmatrix} 4 & -6 \\ -6 & 5 \end{bmatrix}$

B) $\begin{bmatrix} 12 & 1 \\ 8 & -10 \end{bmatrix}$

C) $\begin{bmatrix} 4 & 0 \\ -4 & 8 \end{bmatrix}$

D) $\begin{bmatrix} 1 & 12 \\ -10 & 8 \end{bmatrix}$