Math 1302 Practice Midterm 3 Fall 2011

Dr. Cordero

NAME

1. Solve the equation $\log_5(x+2) - \log_5(x-1) = 2$.

2. Solve $5^{2-x} = 9^x$.

3. Suppose \$3000 is invested at an interest rate k compounded continuously and grows to \$7000 in 10 years. Find the interest rate rounded to two decimal places.

4. If a and b are different solutions of $\log_(x^2 + 6x + 9) = 0$, compute ab.

5. Solve the equation $3 = a \cdot 2^{3x}$ for x.

6. Find all x that satisfy: $\log_5(\log x^3) = 1$.

7. The population in a certain country was 40 million in 1989 with an exponential growth rate of 3.1 % per year. Assuming that this data continues to apply, predict, to the nearest million, what was the population of that country in 2000.

8. Suppose that \$5,000 is invested at an interest rate of 4.5% per year, compounded continuously. How long will it take for the invested amount to triple?

9. Solve: $\ln(x+1) - \ln(x) = \ln 5$.

10. Solve the system of equations and find the sum of the x and y values in the solution.
$$\begin{aligned} 2x + 5y &= 3 \\ 3x - y &= -2 \end{aligned}$$

11. How many solutions does the following system has?
$$\begin{aligned} \tfrac{2}{5}x - y &= \tfrac{1}{5} \\ 2x - \tfrac{7}{3} &= \tfrac{8}{3} \end{aligned}$$

12. Mr. Algebra buys 4 movie tickets and 2 popcorns for \$48. Right behind him, Cindy Likesmath buys 5 tickets and 3 popcorns for \$64. How much are the movie tickets?

13. Find the $x-$coordinate of the solution to the system:
$$\begin{aligned} 2x + 3y &= 3 \\ 4x + 2y &= -8 \end{aligned}$$

14. Almonds, which cost \$6 per pound, are to be mixed with peanuts, which cost \$4 per pound, to make a 16-pound bag of a blend that sells for \$5.25 per pound. How many pounds of peanuts should be used?

15. Solve the system of equations and find the sum of the x, y, and z values in the solution.
$$\begin{aligned} 2x + y + z &= 2 \\ y - 2z &= 3 \\ y + z &= -1 \end{aligned}$$

16. Find the inverse of the matrix: $\begin{bmatrix} 1 & 4 \\ 2 & 5 \end{bmatrix}$

17. Let $A = \begin{bmatrix} 2 & -4 \\ 3 & 2 \end{bmatrix}$ and let $B = \begin{bmatrix} 3 & 1 \\ 2 & 4 \end{bmatrix}$.
Find $AB + BA$.

18. Let $A = \begin{bmatrix} 1 & -4 \\ -1 & 2 \end{bmatrix}$ $\quad B = \begin{bmatrix} 1 & 1 \\ 2 & -6 \end{bmatrix}$

$C = \begin{bmatrix} 1 & 1 \\ 3 & 4 \\ 1 & 6 \end{bmatrix}$ $\quad D = \begin{bmatrix} 1 & -3 & 4 & -5 \\ 1 & -2 & 7 & -3 \\ 1 & 1 & -1 & 1 \\ -1 & 1 & -6 & 1 \end{bmatrix}$

$E = \begin{bmatrix} 0 \\ 2 \\ 1 \\ 6 \end{bmatrix}$

Which operations are defined?

a) $A + B$ b) DE c) BC

d) CA e) CB

19. Using the matrices in problem 18, compute $A - B$.

20. Using the matrices in problem 18,

compute $(A - B)B$.

21. How many solutions does the following system has?

$$\begin{aligned} 1x - 3y + 5z &= 7 \\ 5x - 65y + 20z &= 30 \\ -4x + 26y - 10z &= -14 \end{aligned}$$

22. For the given matrices A and B, which of the following are **false**?

$A = \begin{bmatrix} 1 & -4 \\ -1 & 2 \end{bmatrix} \qquad B = \begin{bmatrix} 1 & 3 \\ 1 & -6 \end{bmatrix}$

a) AB is a square matrix

b) $A - B$ is a square matrix

c) A^{-1} exists

d) B^{-1} exists

e) $A - B = B - A$

23. Sheila invested \$15,000 into three accounts paying 3%, 4%, and 6% interest, respectively. After one year her interest from the 3 accounts was \$1150. She invested \$1,000 more into the account paying 4% than in the account paying 3%. Find the amount of money she invested in each account.

24. Which of the following are acceptable row operations in the Gauss-Jordan method

a) Interchange any two rows

(b) Multiply all of the elements in one row by 0

(c) Add a nonzero multiple of one row to another row.

(d) Divide all the elements in one row by a nonzero constant

(e) All of the above are allowed

25. What is the augmented matrix for the system?

$$\begin{aligned} 2x + y &= 3 \\ 3y + 2x &= -8 \end{aligned}$$