Math 104 PRACTICE TEST 3

1. The result of pivoting the matrix $\begin{pmatrix} 1 & 3 \\ 4 & -2 \end{pmatrix}$ about the 1–2 entry is

a. $\begin{pmatrix} \frac{1}{3} & 1 \\ 14/3 & 0 \end{pmatrix}$ b. $\begin{pmatrix} 0 & \frac{3}{2} \\ 1 & \frac{-1}{2} \end{pmatrix}$ c. $\begin{pmatrix} \frac{1}{3} & 1 \\ 4 & -2 \end{pmatrix}$

d. $\begin{pmatrix} 1 & 3 \\ 1 & \frac{-1}{2} \end{pmatrix}$ e. $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

2. Find the general solution of the following system

$$\begin{cases} x - y + 2z = 2 \\ y - 2z = 1 \\ -3x + 5y - 10z = -4 \end{cases}$$

a. (x, y , z) = (3, 3, 1) b. (x, y, z) = (3, 1, 0)

c. (x, y, z) = (0, 0, 1) d. x = 3, y – 2z = 1

e. There is no solution.

3. While solving a system of linear equations with the unknowns x, y, and z using the Gaussian elimination method, the following matrix was obtained

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & 4 \\ 0 & 1 & -1 & 3 \\ 0 & 0 & 0 & 2 \end{array}\right]$$

What can be concluded about the solution of the system?

a. x = 4, y – z = 3 b. (x, y, z) = (4, 0, 2)

c. (x, y, z) = (4, 4, 1) c. x = 4, y + z = 2

e. There is no solution.

4. The inverse of the matrix $\begin{pmatrix} 2 & 1 \\ 7 & 3 \end{pmatrix}$ is

a. $\begin{pmatrix} -3 & 1 \\ 7 & -2 \end{pmatrix}$ b. $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ c. $\begin{pmatrix} -2 & -1 \\ -7 & -3 \end{pmatrix}$

d. $\begin{pmatrix} 3 & 1 \\ -7 & 2 \end{pmatrix}$ e. $\begin{pmatrix} -2 & 1 \\ 7 & 3 \end{pmatrix}$

5. Let

A = **Error!**) and B = **Error!**)

In order for A and B to be inverses, X and Y must be

a. x = –5, y = 5/3 b. x = – 1/5, y = 2/5

c. x = 1, y = 0 d. x = 1, y = 1/2

e. none of the above

6. Solve the system

$$\begin{cases} 2x + y = 2 \\ 3x + y = -1 \end{cases}$$

by finding the inverse of $\begin{pmatrix} 2 & 1 \\ 3 & 1 \end{pmatrix}$.

a) (x,y) = (1,0) b) (x,y) = (–1, 4)

c) (x,y) = (–3,8) d) (x,y) = (6, –19)

e) There is no solution.

7. Which of the following points satisfies the system of linear inequalities

$$\begin{cases} x \geq 0 \\ x + y \leq 1 \\ x - 2y \leq 8 \end{cases}$$

a) (–2, 0) b) (–1, 2) c) (3, –2)

d) (4, –5) e. none of the above

8. The point of intersection of the lines $x + 3y = 6$ and $x - y = 2$ is

a) (0,2) b) (3,1) c) (8,6)
d) (–3, –5) e) The lines do not intersect.

9. Give the standard form of the equation of the line passing through the point (2,3) and which is perpendicular to the line $y = \frac{1}{4}x - \frac{1}{4}$.

a) $y = \frac{-1}{4}x + \frac{7}{3}$ b) $y = 4x - 5$ c) $y = 2x + 3$

d) $y = -4x + 11$ e) None of the above.

10. Assume that 80% of all children who are exposed to chicken pox contract the disease. If 1225 children are exposed to chicken pox, the probability that more than 945 of them will contract the disease is approximately the area under the standard normal curve

a. to the right of – 2.50 b. to the right of – .18

c. to the right of – 2.46 d. to the left of 2.46

e. none of the above

11. A die is thrown 60 times. What is the probability that a 6 shows up exactly 10 times?

a) .5596 b) .1192 c) .1666 d) .4404
e) none of the above.

12. Use the Gauss -Jordan method to find the inverse of the matrix

$$A = \begin{pmatrix} 1 & 1 & 1 \\ 1 & 1 & 2 \\ 4 & 5 & 5 \end{pmatrix}$$

a) $\begin{pmatrix} 5 & 0 & -1 \\ -3 & -1 & 1 \\ -1 & 1 & 0 \end{pmatrix}$ b) $\begin{pmatrix} 1 & 1 & 4 \\ 1 & 1 & 5 \\ 1 & 2 & 5 \end{pmatrix}$ c) $\begin{pmatrix} 5 & -1 & -4 \\ -1 & 1 & -5 \\ -1 & -2 & 1 \end{pmatrix}$

d) $\begin{pmatrix} 5 & 1 & -4 \\ 1 & 1 & 5 \\ -1 & 2 & 1 \end{pmatrix}$ e) Not defined.

13. Use the Gauss-Jordan method to compute the inverse of the matrix $\begin{pmatrix} 2 & 3 \\ 3 & 4 \end{pmatrix}$.

a) $\begin{pmatrix} 4 & -3 \\ -3 & 2 \end{pmatrix}$ b) $\begin{pmatrix} -2 & -3 \\ -3 & -4 \end{pmatrix}$ c) $\begin{pmatrix} 2 & -3 \\ 3 & 4 \end{pmatrix}$

d) $\begin{pmatrix} 4/3 & -3/4 \\ -3/4 & 2/3 \end{pmatrix}$ e) None of the above.

14. Use the Gauss-Jordan method to compute the inverse of the matrix

$$\begin{pmatrix} 2 & 6 & 0 \\ -1 & -3 & 0 \\ 7 & 7 & 1 \end{pmatrix}.$$

a) $\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$ b) $\begin{pmatrix} -2 & -6 & 0 \\ 1 & 3 & 0 \\ -7 & -7 & -1 \end{pmatrix}$

c) $\begin{pmatrix} 1 & -1 & 7 \\ 6 & -3 & 7 \\ 0 & 0 & 2 \end{pmatrix}$ d) $\begin{pmatrix} 1 & 1 & 7 \\ -6 & -3 & -7 \\ 0 & 0 & 2 \end{pmatrix}$

e) There is no inverse

15. Which of the following calculations can be performed?

I. $[4 \quad 0 \quad 2] + \begin{pmatrix} 1 \\ 3 \\ 5 \end{pmatrix}$ II. $[6] + \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

III. $[5] \times \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ IV. $\begin{pmatrix} 2 & 1 & 2 \\ 4 & 0 & 1 \end{pmatrix} \times \begin{pmatrix} 1 \\ 1 \\ 2 \end{pmatrix}$

a. I and II only b. III and IV only c. III only

d. IV only e. I, II, III, IV

16. Let $A = \begin{pmatrix} 1 & 4 \\ 2 & 3 \end{pmatrix}$ and $B = \begin{pmatrix} 3 & -2 \\ 4 & 6 \end{pmatrix}$

The 2-1 entry of AB is

a. 6 b. 8 c. 18 d. 22 e. 34

17. Two hundred students are registered in a certain mathematics course. Experience suggests that if x and y represent the number of students who earn a grade of C or better on Exam I and the number of students who earn a grade of D or F on Exam I, respectively, and if p and n represent the number of students who earn a grade of C or better on Exam II and the number of students who earn a grade of D or F on Exam II, respectively, then

$$.9x + .3y = p$$
$$.1x + .7y = n$$

Suppose 120 students earn a grade of C or better on Exam II. How many students earned a grade of D or F on Exam I?

a) 120 b) 100 c) 80d) 60 e) None of the above

18. Use Gaussian elimination to solve the following system:

$$\begin{cases} 2x + 3y = 0 \\ x + 2y = 1 \end{cases}$$

a) (x,y) = (3,–2)b) (x,y) = (–3,2) c) (x,y) = (0,0)
d) (x,y) = (7,–3) e) There is no solution.

19. Use Gaussian elimination to solve the following system:

$$\begin{cases} x - y - 2z = 2 \\ y - 2z = 1 \\ -3x + 5y - 10z = -4 \end{cases}$$

a) $x = 1,\ y - 2z = 1$ b) $(x,y,z) = (1,1,0)$
c) $(x,y,z) = (3,1,0)$ d) $(x,y,z) = (1,-5,-3)$
e) None of the above

20. At a certain party, 72 people are invited. Only half of those invited come. Of those who come, twice as many are women as are men. How many men and how many women come?

a) $(x,y) = (24,12)$ b) $(x,y) = (48,24)$
c) $(x,y) = (12,24)$ d) $(x,y) = (24,48)$
e) None of the above.