Exam

Name_____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Provide an appropriate response.

1) If $A = \begin{bmatrix} 1 & 6 & 0 & 4 \\ 2 & 3 & 1 & 0 \\ 4 & 7 & 2 & 8 \end{bmatrix}$, determine (a) $a_{32}$, and (b) the order of $A$. 1) _____

2) Solve the matrix equation: $\begin{bmatrix} x & y+2 \\ x+y & 4 \end{bmatrix} = \begin{bmatrix} x & 1 \\ 0 & 4 \end{bmatrix}$ 2) _____

3) Solve the matrix equation: $\begin{bmatrix} x & y-1 \\ 5 & 2x \end{bmatrix} = \begin{bmatrix} 2y & 4 \\ 5 & 2x \end{bmatrix}$ 3) _____

4) Write $A = [a_{ij}]$ if $A$ is $2 \times 2$ and $a_{ij} = 2i + j$. 4) _____

5) Write $A = [a_{ij}]$ if $A$ is $2 \times 3$ and $a_{ij} = 2i + j$. 5) _____

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

6) If $\begin{bmatrix} 3x & -y \\ x & y \end{bmatrix} = \begin{bmatrix} 3 & 2 \\ 2x & y \end{bmatrix}$, then $y =$ 6) _____

A) -2. B) 0. C) -4. D) 2. E) 4.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

7) Write a diagonal matrix of size $3 \times 3$ with entries $a_{ii} = i + 3$, $a_{ij} = 0$ for $i \neq j$. 7) _____

8) Find the transpose of the matrix: $\begin{bmatrix} 1 & 3 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$ 8) _____

9) Find the transpose of $\begin{bmatrix} 5 & 0 & 4 \\ 9 & 5 & 3 \end{bmatrix}$. 9) _____

10) Find transpose of $\begin{bmatrix} 9 & -2 & -7 \\ -5 & 5 & 3 \\ 4 & 6 & -3 \end{bmatrix}$. 10) _____

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

11) Consider the matrix $\begin{bmatrix} 5 & -9 & -1 \\ 0 & 7 & -1 \\ 0 & 0 & 3 \end{bmatrix}$, this matrix can be best described as a(n): 11) _____

A) lower triangular matrix
B) diagonal matrix
C) main diagonal
D) upper triangular matrix

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

12) Perform the indicated operations and simplify your answer: $\begin{bmatrix} 3 & -1 \\ 4 & 2 \\ 6 & -8 \end{bmatrix} + 2\begin{bmatrix} 4 & -1 \\ 0 & 5 \\ -4 & 3 \end{bmatrix}$ 12) _____

13) Perform the indicated operations and simplify your answer: $3\begin{bmatrix} 0 & 0 \\ -1 & 2 \end{bmatrix} - 4\begin{bmatrix} 1 & 9 \\ 0 & -3 \end{bmatrix}$ 13) _____

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

14) If $4\begin{bmatrix} 1 & x \\ -2 & 0 \end{bmatrix} + 2\begin{bmatrix} -2 & 0 \\ y & 0 \end{bmatrix} = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$, then 14) _____

A) $x = 0$ and $y = 0$.
B) $x = 4$ and $y = -5$.
C) $x = \frac{1}{4}$ and $y = \frac{1}{2}$.
D) $x = 0$ and $y = 4$.
E) There are no values for $x$ and $y$ which satisfy the equation.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

15) If $A = \begin{bmatrix} 1 & 2 & 3 \\ 3 & 4 & 5 \end{bmatrix}$; $B = \begin{bmatrix} 2 & -1 & -2 \\ 1 & -3 & -2 \end{bmatrix}$, then find $(A + B)^T$. 15) _____

16) Find $x, y, z, u, t, v$ such that $\begin{bmatrix} x & y & z \\ u & t & v \end{bmatrix} + 2\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix} = \begin{bmatrix} 8 & 3 & 5 \\ 9 & 8 & 14 \end{bmatrix}$ 16) _____

17) Solve the matrix equation: $3\begin{bmatrix} x \\ y \\ z \end{bmatrix} - 2\begin{bmatrix} 1 \\ -2 \\ 3 \end{bmatrix} = \begin{bmatrix} 1 \\ 10 \\ 3 \end{bmatrix}$ 17) _____

18) Solve the matrix equation: $x\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} + 2\begin{bmatrix} 3 \\ 5 \\ 1 \end{bmatrix} + y\begin{bmatrix} 0 \\ 3 \\ 0 \end{bmatrix} = \begin{bmatrix} 4 \\ 3 \\ x - y - 3 \end{bmatrix}$ 18) _____

19) If $A = \begin{bmatrix} -8 & 3 \\ 2 & 1 \\ 1 & -7 \end{bmatrix}$ and $B = \begin{bmatrix} 5 & 2 \\ -2 & 9 \\ 4 & -3 \end{bmatrix}$, find $A + B$. 19) _____

20) If $A = \begin{bmatrix} -8 & 3 \\ 2 & 1 \\ 1 & -7 \end{bmatrix}$ and $B = \begin{bmatrix} 5 & 2 \\ -2 & 9 \\ 4 & -3 \end{bmatrix}$, find $A - B$. 20) _____

21) If $A = \begin{bmatrix} -8 & 3 \\ 2 & 1 \\ 1 & -7 \end{bmatrix}$ and $B = \begin{bmatrix} 5 & 2 \\ -2 & 9 \\ 4 & -3 \end{bmatrix}$, find $2A - 3B$. 21) _____

22) If $A = \begin{bmatrix} -8 & 3 \\ 2 & 1 \\ 1 & -7 \end{bmatrix}$, $B = \begin{bmatrix} 5 & 2 \\ -2 & 9 \\ 4 & -3 \end{bmatrix}$, and $C = \begin{bmatrix} 7 & -1 \\ 5 & -2 \\ 3 & -3 \end{bmatrix}$, find $4A - 2B + 3C$. 22) _____

23) If $A = \begin{bmatrix} -8 & 3 \\ 2 & 1 \\ 1 & -7 \end{bmatrix}$, $B = \begin{bmatrix} 5 & 2 \\ -2 & 9 \\ 4 & -3 \end{bmatrix}$, and $C = \begin{bmatrix} 7 & -1 \\ 5 & -2 \\ 3 & -3 \end{bmatrix}$, find $7A + 6B - 3C$. 23) _____

24) 24) _____

Perform the indicated operation and simplify your answer: $\begin{bmatrix} 1 & -1 & 0 \\ 2 & 3 & 4 \end{bmatrix} \begin{bmatrix} 1 & 0 \\ 5 & 1 \\ -2 & 3 \end{bmatrix}$

25) Perform the indicated operation and simplify your answer: $\begin{bmatrix} 2 \\ 4 \end{bmatrix} \begin{bmatrix} 3 & 1 & 0 \end{bmatrix}$ 25) _____

26) 26) _____

Perform the indicated operation if possible: $\begin{bmatrix} 4 \\ 8 \\ 0 \end{bmatrix} \begin{bmatrix} 2 & 6 & 5 \\ 4 & -1 & 3 \end{bmatrix}$

27) Perform the indicated operations and simplify your answer: $2\begin{bmatrix} 3 \\ 1 \end{bmatrix} - \begin{bmatrix} 1 & 2 \\ -3 & 0 \end{bmatrix} \begin{bmatrix} 1 \\ 0 \end{bmatrix}$ 27) _____

1) (a) 7 (b) $3 \times 4$

2) $x = 1, y = -1$

3) $x = 10, y = 5$

4) $\begin{bmatrix} 3 & 4 \\ 5 & 6 \end{bmatrix}$

5) $\begin{bmatrix} 3 & 4 & 5 \\ 5 & 6 & 7 \end{bmatrix}$

6) A

7) $\begin{bmatrix} 4 & 0 & 0 \\ 0 & 5 & 0 \\ 0 & 0 & 6 \end{bmatrix}$

8) $\begin{bmatrix} 1 & 4 & 7 \\ 3 & 5 & 8 \\ 3 & 6 & 9 \end{bmatrix}$

9) $\begin{bmatrix} 5 & 9 \\ 0 & 5 \\ 4 & 3 \end{bmatrix}$

10) $\begin{bmatrix} 9 & -5 & 4 \\ -2 & 5 & 6 \\ -7 & 3 & -3 \end{bmatrix}$

11) D

12) $\begin{bmatrix} 11 & -3 \\ 4 & 12 \\ -2 & -2 \end{bmatrix}$

13) $\begin{bmatrix} -4 & -36 \\ -3 & 18 \end{bmatrix}$

14) D

15) $\begin{bmatrix} 3 & 4 \\ 1 & 1 \\ 1 & 3 \end{bmatrix}$

16) $x = 6, y = -1, z = -1, u = 1, t = -2, v = 2$

17) $x = 1, y = 2, z = 3$

18) $x = -2, y = -1$

19) $\begin{bmatrix} -3 & 5 \\ 0 & 10 \\ 5 & -10 \end{bmatrix}$

20) $\begin{bmatrix} -13 & 1 \\ 4 & -8 \\ -3 & -4 \end{bmatrix}$

21) $\begin{bmatrix} -31 & 0 \\ 10 & -25 \\ -10 & -5 \end{bmatrix}$

22) $\begin{bmatrix} -21 & 5 \\ 27 & -20 \\ 5 & -31 \end{bmatrix}$

23) $\begin{bmatrix} -47 & 36 \\ -13 & 67 \\ 22 & -58 \end{bmatrix}$

24) $\begin{bmatrix} -4 & -1 \\ 9 & 15 \end{bmatrix}$

25) $\begin{bmatrix} 6 & 2 & 0 \\ 12 & 4 & 0 \end{bmatrix}$

26) not defined

27) $\begin{bmatrix} 5 \\ 5 \end{bmatrix}$