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 $A = \begin{bmatrix} a_{ij} \end{bmatrix}$ if A is 2×2 and $a_{ij} = 2i + j$.

4) _____

5) Write $A = \begin{bmatrix} a_{ij} \end{bmatrix}$ if A is 2×3 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 $y =$

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

6) _____

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

7) Write a diagonal matrix of size 3×3 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) _____

1

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):

A) lower triangular matrix   B) diagonal matrix

C) main diagonal   D) upper triangular matrix

11) _____

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

A) $x = 0$ and $y = 0$.

B) $x = 4$ and $y = -5$.

C) $x = \dfrac{1}{4}$ and $y = \dfrac{1}{2}$.

D) $x = 0$ and $y = 4$.

E) There are no values for x and y which satisfy the equation.

14) _____

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) _____

2

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)

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

24) _____

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

25) _____

26)

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

26) _____

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) _____

3

1) (a) 7   (b) 3 × 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) $\begin{bmatrix} 5 \\ 5 \end{bmatrix}$