

# Don Bosco Catholic Secondary & Preparatory School A.A 2012 E.C

## 3<sup>rd</sup> Quarter Mathematics worksheet for grade 11

Name \_\_\_\_\_ section \_\_\_\_ Roll No. \_\_\_\_

### Part I : Matrices Questions

I. Write 'True' if the statement is correct and 'False' if the statement is in correct.

1. A lower triangular matrix is a square matrix whose element below the main diagonal are all zero.
2. If A is a square matrix of order n, then  $A + A^T$  is a symmetric matrix.

II. Choose the correct answer from the given alternatives

3. If  $A = (a_{ij})_{m \times n}$  and  $B = (b_{ij})_{k \times p}$  are two matrices, for what condition AB is exist?  
A.  $m = k$                       B.  $n = p$                       C.  $n = k$                       D.  $m = p$

4. Which of the following are the values of x and y respectively

$$\text{if } \begin{pmatrix} 2 & -2 \\ y & z-1 \end{pmatrix} \begin{pmatrix} 8 & z \\ 5 & 4 \end{pmatrix} = \begin{pmatrix} x & 4 \\ 1 & 2 \end{pmatrix}$$

A. 3, 4

B. -3, 6

C. 6, -3

D. 5, 7

5. What is the inverse of  $A = \begin{pmatrix} 6 & 2 \\ 4 & 2 \end{pmatrix}$

A.  $\begin{pmatrix} 2 & 4 \\ 6 & 2 \end{pmatrix}$

B.  $\begin{pmatrix} 2 & -2 \\ -4 & 6 \end{pmatrix}$

C.  $\begin{pmatrix} \frac{1}{2} & -1/2 \\ -1 & 3/2 \end{pmatrix}$

D.  $\begin{pmatrix} 6 & 2 \\ 4 & 2 \end{pmatrix}$

6. Suppose that  $A = \begin{pmatrix} -1 & 3 & 1 \\ 2 & 4 & x \end{pmatrix}$  and  $B = \begin{pmatrix} 1 & 2 \\ 0 & 7 \\ 9 & 1 \end{pmatrix}$  are given. If the (2, 3) entry of the product BA is 14. What is value of x

A. 2

B. 3

C. 4

D. 1

7. Find the matrix D such that  $DA = B$  where

$$A = \begin{pmatrix} 2 & 3 \\ 3 & 4 \end{pmatrix} \text{ and } B = \begin{pmatrix} -1 & 1 \\ 2 & -3 \end{pmatrix}$$

A.  $\begin{pmatrix} 1 & 1 \\ -5 & -6 \end{pmatrix}$

B.  $\begin{pmatrix} -4 & 3 \\ 3 & -2 \end{pmatrix}$

C.  $\begin{pmatrix} 4 & -7 \\ 5 & -9 \end{pmatrix}$

D.  $\begin{pmatrix} 7 & -5 \\ -17 & 12 \end{pmatrix}$

8. Suppose that  $A = \begin{pmatrix} 2 & 1 & 0 \\ 3 & 7 & -1 \\ -2 & 4 & x \end{pmatrix}$  and  $B = \begin{pmatrix} 5 & 6 \\ 7 & 8 \\ 1 & 2 \end{pmatrix}$  are given if the (3, 1) entry of the product AB is 3. What is the value of x

A. 10

B. -23

C. -15

D. -14

9. Let  $A = \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$  be  $2 \times 2$  matrix. Then the value of  $A^{2k+1}$  for any  $k \in \mathbb{N}$  is equal to

A.  $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

C.  $\begin{pmatrix} 0 & 0 \\ 0 & 1 \end{pmatrix}$

B.  $\begin{pmatrix} 1 & 0 \\ 0 & 0 \end{pmatrix}$

D.  $\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$

10. A matrix  $A = (a_{ij})_{n \times n}$  is upper triangular, if  $a_{ij} = 0$  for each  $i > j$ ,  $i, j = 1, 2, 3 \dots n$ , which of the following is true?

A.  $\begin{pmatrix} -3 & 0 \\ 1 & 0 \end{pmatrix}$  is upper triangular

B. The transpose of an upper triangular matrix is upper triangular

C. Identity matrix is not upper triangular

D. If  $A$  is upper triangular then  $|A| = a_{11} a_{22} \dots a_{nn}$

11. If  $\begin{pmatrix} 0 & 2 & -4 \\ -2 & 0 & 6 \\ 4 & m & 0 \end{pmatrix}$  is a skew-symmetric matrix, what is the value of  $m$ ?

A. 6

B. -6

C. 4

D. -4

12. If  $A, B, C$  are respectively  $3 \times 4, 4 \times 5, 5 \times 1$  matrices, then the size of  $ABC$  is \_\_\_\_\_.

A.  $3 \times 1$

B.  $1 \times 3$

C.  $4 \times 1$

D. doesn't exist

## Part II : Determinants Questions

Write 'True' if the statement is correct and 'False' if the statement is incorrect.

13. If  $B$  is a matrix obtained by adding a multiple of a row (column) of  $A$  to another row (column) of  $A$ , then  $|A| \neq |B|$

14.  $\begin{vmatrix} a+x & c+v \\ b & d \end{vmatrix} = \begin{vmatrix} a & c \\ b & d \end{vmatrix} + \begin{vmatrix} x & v \\ b & d \end{vmatrix}$

15. A square matrix  $A$  is singular if and only if  $\det(A) = 0$

16. Two systems of linear equations are equivalent, if and only if they have exactly the same solution.

Choose the correct answer from the given alternatives

17. Given that  $\begin{vmatrix} a & b & c \\ d & e & f \\ g & h & i \end{vmatrix} = 3$  what is the value of  $\begin{vmatrix} a+3c & b & c \\ d+3f & e & f \\ g+3i & h & i \end{vmatrix}$

A. 3

B. 6

C. 24

D. 5

18. For what value of  $x$  the matrix  $\begin{vmatrix} 1 & 2 & -1 \\ -x & 1 & 2 \\ 2 & -1 & x \end{vmatrix}$  is singular

A. R

B. -2, 2

C.  $\emptyset$

D. -4, 4

19. Find x,  $\begin{vmatrix} x+9 & 3 & 5 \\ x+9 & x+2 & 5 \\ x+9 & 3 & x+4 \end{vmatrix} = 0$

- A. -9 or 1                      B. -9 or -1                      C. -9, -1 or 1                      D. 9 or -1

20. If  $\begin{pmatrix} x & 1 \\ 3 & 1 \end{pmatrix}$  is the inverse of  $\begin{pmatrix} -1 & y \\ 3 & -2 \end{pmatrix}$ , then the value of x and y respectively are

- A. 1, 2                      B. 3, 1                      C. 6, 5                      D. 1, 2

21. What should be the value of a and b so that the system  $\begin{cases} 3x - ay = 1 \\ 6x + 4y = b \end{cases}$  has no solution

- A.  $a = 2, b \neq 3$   
 B.  $a \neq -2, b = 2$   
 C.  $a = -2, b \neq 2$   
 D.  $a = -2, b = 2$

22. Let  $A = \begin{pmatrix} a & a & ac \\ b & -b & bc \\ c & c & -c^2 \end{pmatrix}$ . Then  $\det(A)$  is equal to:-

- A.  $zabc^2$                       B.  $-4abc^2$                       C. 0                      D.  $4abc^2$

23. Suppose A is a 3 x 3 matrix and  $B = \begin{pmatrix} 0 & 4 & 8 \\ 5 & 0 & 6 \\ 0 & 4 & 2 \end{pmatrix}$ . If  $\det(A) = 3$  the determinate,

$\det(A^{-1} B^T)$  is equal to

- A. 40                      B. 60                      C. 0                      D. 30

24. Given matrix  $B = \begin{pmatrix} 2 & -1 \\ 3 & 0 \end{pmatrix}$ , which of the following a matrix A such that  $AB = A + B$ ?

A.  $\begin{pmatrix} 1/2 & 1/2 \\ 3/2 & -3/2 \end{pmatrix}$

C.  $\begin{pmatrix} 1/2 & 1/2 \\ -3/2 & 3/2 \end{pmatrix}$

B.  $\begin{pmatrix} 1/2 & 1 \\ -3/2 & 3/2 \end{pmatrix}$

D.  $\begin{pmatrix} 1/2 & -1/2 \\ 3/2 & -3/2 \end{pmatrix}$

25. If A is invertible matrix with inverse D. then what is the inverse of  $A^T$

- A. D                      B. A                      C.  $D^T$                       D. AD

26. For what values of a and b  $\begin{cases} 3x - ay = 1 \\ bx + 4y = 6 \end{cases}$  has no solution

A.  $a = -2/3, b \neq 18$

C.  $a \neq -\frac{2}{3}, b = 18$

B.  $a \neq -2/3, b \in R$

D.  $a \neq -2/3, b \neq 18$

27. The solution set of  $\begin{pmatrix} 5 & 2 & 1 \\ 3 & 2 & 0 \\ 1 & 0 & 2 \end{pmatrix} \begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 8 \\ 5 \\ 3 \end{pmatrix}$  is

A.  $\{1, 1, 1\}$

C.  $\mathbb{R}$

B.  $\{1, 2, 1\}$

D.  $\emptyset$

28. What is the inverse of  $A = \begin{pmatrix} 3 & 2 \\ 7 & 5 \end{pmatrix}$

A.  $\begin{pmatrix} 3 & 2 \\ 7 & 5 \end{pmatrix}$

B.  $\begin{pmatrix} 3 & -7 \\ -2 & 5 \end{pmatrix}$

C.  $\begin{pmatrix} 5 & -2 \\ -7 & 3 \end{pmatrix}$

D.  $\begin{pmatrix} -5 & 7 \\ 2 & -3 \end{pmatrix}$

29. Given the system of equations:

$$\begin{cases} x - 3y + Z = 0 \\ 4x + Z = 3 \\ -3x + y - Z + 2 = 0 \end{cases} \text{ its solution set is :-}$$

A.  $\mathbb{R}$

B.  $\emptyset$

C.  $\{t, 1-t, 3-4t, t \in \mathbb{R}\}$

D.  $\{1, 3, 4\}$

30. Let  $A = \begin{pmatrix} k & 2 \\ 5 & -1 \end{pmatrix}$  which of the following is necessarily true

A. For any number  $k$ ,  $A$  is invertible

B. If  $k \neq 10$ , then  $A^{-1} = \frac{1}{-k-10} \begin{pmatrix} 1 & -2 \\ -5 & k \end{pmatrix}$

C. If  $k \neq -10$ , then  $A^{-1} = \frac{1}{k+10} \begin{pmatrix} 1 & 2 \\ 5 & -k \end{pmatrix}$

D. If  $k \neq 0$ , then  $A$  invertible

31. What should be the values of  $\alpha$  and  $\beta$ , respectively, so that  $\begin{pmatrix} \alpha & 1 \\ 1 & \beta \end{pmatrix}$  is the

inverse of  $\begin{pmatrix} 0 & 1 \\ 1 & 1 \end{pmatrix}$

A.  $0, 0$

B.  $1, 1$

C.  $-1, 0$

D. the matrix is not invertible

***The end !***

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