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Mathematics Work sheet **Sec** _____ **R.No** _____

For Grade 11 **Date March 2020**

Instruction: Choose the correct answer from the given alternative

1. Assume $A=\begin{pmatrix}4 & 0\\ 1 & \end{pmatrix}$ and $B=\begin{pmatrix}2 & 2\\ 1 & \end{pmatrix}$ And If X is a 2×2 matrix such $X+\frac{1}{2}B^T=AB$, then what is the value of X **?**

A. $\begin{pmatrix}7 & 5\\ 1 & \end{pmatrix}$ **B.** $\begin{pmatrix}5 & -3\\ 1 & \end{pmatrix}$ **C.** $\begin{pmatrix}5 & -3\\ 1 & \end{pmatrix}$ **D.** $\begin{pmatrix}7 & 5\\ 1 & \end{pmatrix}$

2. Assume the matrix $A=\begin{pmatrix}x & 2x-1\\ 1 & \end{pmatrix}$ is invertible (non-singular) then possibly x can't be:

A. 1, 4/9 B. -1, 4/9 C. 1, -4/9 D. -1, -4/9

3. For a square matrix A **, if** $AA^T=A^TA=I$ where I is an identity matrix of same order as A then A **is:**

A. Identity matrix B. Symmetric matrix C. Orthogonal matrix D. Zero matrix

4. What is the solution set of the system of equations $\begin{matrix}x+y+2z=1\\ x+2y+z=2\end{matrix}$

A. $\{(0,1,0)\}$ **B.** $(-\infty,\infty)$ **C.** $\{(-3k,k+1,k):k\in R\}$ **D.** $\{(3k,k-1,k):k\in R\}$

5. Consider the system of equations $\begin{matrix}x-2y+z=-1\\ x+y-2z=2\end{matrix}$ this system of equations has:

A. Exactly one solution
B. Infinitely many solutions
C. No solutions
D. None of the above

$A=\begin{pmatrix} 0 & x & 0 \\ 1 & -1 & 1 \end{pmatrix}$ $A^{-1}=\begin{pmatrix} 1 & 1 & 1 \\ 3 & 0 & 0 \end{pmatrix}$

6. If and are inverse of one another what is the value of $x \wedge y$

$A=\begin{pmatrix} 2 & 1 & 0 \\ 1 & 1 & 4 \end{pmatrix}$

7. Consider the matrix then find :

i. **The minor of** a_{23}
ii. **The cofactor of** a_{32}
iii. **The determinant of A that is** $|A|$

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

8. Let and then find matrix D **such that** $DA=B$

$A=\begin{pmatrix} 2 & 1 & -1 \\ 0 & 2 & 1 \end{pmatrix}$

9. Find the inverse of the matrix

10. Using matrix methods solve the system $\begin{vmatrix} x+2y-3z+2w=2 \\ 2x+5y-8z+6w=5 \end{vmatrix}$

11. Determine the value of $a \wedge b$ for which the system $\begin{vmatrix} 3x-2y+z=b \\ 5x-8y+9z=3 \end{vmatrix}$

i. Has unique solution Has many solutions Has no solutions

12. Using Cramer's Rule show that the system $\begin{vmatrix} x+2y-4z=1 \\ 2x+y-5z=-1 \end{vmatrix}$ has a unique solution also find the solution

13. Assume $A=\begin{bmatrix}1 & 2\\ 1 & 1\end{bmatrix}$ **.And If** X **is a** 2×2 **matrix such** $AX-A^T=2A$ **, then what is the value of** X **?**

A. $\begin{bmatrix}3 & 1\\ 1 & 1\end{bmatrix}$ **B.** $\begin{bmatrix}3 & 3\\ 1 & 1\end{bmatrix}$ **C.** $\begin{bmatrix}3 & 6\\ 1 & 1\end{bmatrix}$ **D.** $\begin{bmatrix}3 & 0\\ 1 & 1\end{bmatrix}$

14. For a square matrix A **, which one is not true?**

B. $A+A^T$ **is symmetric matrix**

C. $A+A^T$ **is orthogonal matrix**

C. $A-A^T$ **Skew-symmetric matrix**

D. None of the above

15. Consider the matrices $A=\begin{bmatrix}-2 & 0 & x\\ 1 & 1 & 1\end{bmatrix}$ **and** $B=\begin{bmatrix}1 & -y\\ 0 & 3\\ 1 & 1\end{bmatrix}$ such that $A+2B^T=0$, then solve for y.

6. The simplified form of the expression $\frac{4-3i}{3+4i}+\overline{1-2i}$ *is*:

1

A. $1+i$ **B.** $1+3i$ **C.** $2-i$ **D.** $1-3i$

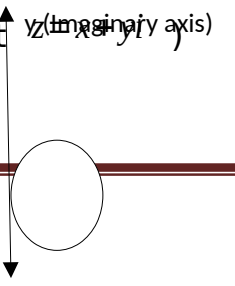
17. If $z=\cos\left(\frac{\pi}{10}\right)+i\sin\left(\frac{\pi}{10}\right)$ *then* $z^{10}=$ ---------- .

A. $\frac{\pi}{2}+\frac{\pi}{2}i$ B. $\frac{1}{2}+\frac{1}{2}i$ C. -1 D. $1+i$

18. Under the set of complex numbers, what will be the solution set of the equation $z^3-iz=0$?

A. $\left\{\pm\frac{1}{\sqrt{2}}(1+i)\right\}$ **B.** $\left\{0,\pm\frac{1}{\sqrt{2}}(1-i)\right\}$ **C.** $\left\{\pm\sqrt{2}(1+i)\right\}$ **D.** $\left\{0,\pm\frac{1}{\sqrt{2}}(1+i)\right\}$

19. The figure on the right best describes which of the following expression on a complex plane? (That is a unit circle centre at $(1,0)$ and let $z=x+yi$)

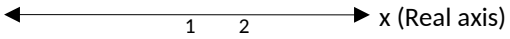


A. $|z-1|=1$

B. $|z|+1=-1$

C. $|z|-1=1$

D. $|z+1|=1$



20. What are the value of $s \wedge t$ that satisfy the equation: $\frac{s+3i}{4-2i}=\frac{2+ti}{20}$?

A. $s=2,\ t=3$

B. $s=-6,\ t=10$

C. $s=2,\ t=16$

D. $s=-4,\ t=6$

21. Which of the following is equal to $\left[4\left(\cos 20^0+i\sin 20^0\right)\right]\left[3\left(\cos 25^0+i\sin 25^0\right)\right]$?

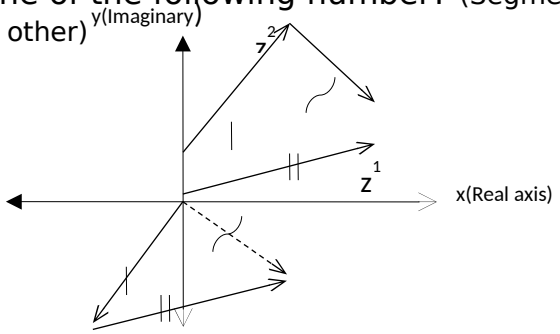
A. $6\sqrt{2}(1-i)$

B. $3\sqrt{2}(1+i)$

C. $3\sqrt{2}(1-i)$

D. $6\sqrt{2}(1+i)$

22. On the complex plane to the right, assume $z_1 \wedge z_2$ stands for complex number then the broken (----) segment represent which one of the following number? (Segments having same marks are parallel & congruent to each other)



A. z_1+z_2

B. z_1-z_2

C. z_2-z_1

D. $2(z_1+z_2)$

23. Once we perform the indicated operations, the expression $\frac{6\sqrt{3}\left(\cos 40^0+i\sin 40^0\right)}{3\left(\cos 190^0+i\sin 190^0\right)}$ is equal to:

A. $3+\sqrt{3}i$ $-3-\sqrt{3}i$

B. $3-\sqrt{3}i$

C. $-3+\sqrt{3}i$

D.

24. If $w=\frac{16i}{1+i}+(1-3i)^2$ *and* $z=|w|+\bar{w}$, *then the simplest form of* z *is*:

A. $\sqrt{2}+2i$

B. $2+2i$

C. $4-2i$

D. $2-2i$

25. The polar form of a complex number $z=-\sqrt{3}-i$ *is*:

A. $z=2\left(\cos\frac{\pi}{6}+i\sin\frac{\pi}{6}\right)$

C. $z=2\left(\cos\frac{7\pi}{6}+i\sin\frac{7\pi}{6}\right)$

B. $z=2\left(\cos\frac{11\pi}{6}+i\sin\frac{11\pi}{6}\right)$

D. $z=2\left(\cos\frac{5\pi}{6}+i\sin\frac{5\pi}{6}\right)$

26. The simplest form of the expression $\left(\frac{1-i}{\sqrt{2}}\right)^{40}$ *is*:

A. $1-i$ B. 1 C. $1+i$ D. -1

27. What is the principal argument of $z=(5+5i)^{11}$?

A. $\frac{\pi}{3}$ B. $\frac{2\pi}{3}$ C. $\frac{\pi}{4}$ D. $\frac{3\pi}{3}$

28. If $z_1=\frac{2-i}{1+i} \wedge z_2=\frac{1+i}{1-i}$ **then what is the value of** $(z_1+2z_2)=$_____

B. $1+i$ **B.** $\frac{1+i}{2}$ **C.** $\frac{1-i}{2}$ **D.** $1-i$

29. Simplify the expression below as much as possible and give your answer in the form $x+yi.$

$$|3+4i|+\frac{25i}{3+4i}$$

30. Write the complex number $z=-\sqrt{3}i$ in polar form.

31. Under the set of complex numbers, what will be the solution set of the equation $x^2-2x+5=0$?

A. $\{\}$ $\{2+4i,2-4i\}$ **B.** $\{2+i,2-i\}$ **C.** $\{1+2i,1-2i\}$ **D.**

32. The polar form of the complex number $z=1-\sqrt{3}i$ *is*:

A. $2\left(\cos\frac{5\pi}{3}+i\sin\frac{5\pi}{3}\right)$

C. $2\left(\cos\frac{\pi}{6}+i\sin\frac{\pi}{6}\right)$

B. $2\left(\cos\frac{\pi}{6}-i\sin\frac{\pi}{6}\right)$ D. $2\left(\cos\frac{5\pi}{3}-i\sin\frac{5\pi}{3}\right)$

33. The value of x so that $\begin{vmatrix} x & x+4 \\ \end{vmatrix}$

$A=\begin{vmatrix} 0 & x & x \\ 1 & -2 & 3 \\ \end{vmatrix}$

34. For what value of x and y a matrix is invertible

$A=\begin{vmatrix} 2 & 0 & 0 \\ 1 & 5 & 0 \\ \end{vmatrix}$ and $|B|=\frac{1}{10}$

35. let A and B be 3*3 matrices such that then what is the value of $|AB^T|$?

$A=\begin{pmatrix} \alpha & 2 & \beta \\ 2 & 1 & 3 \\ \end{pmatrix}$

36. If and determinant of coefficient matrix is -5 then what is the value of x?

37. Consider the matrix below then find the required minors and co-factors.

$A=\begin{vmatrix} -1 & 4 & 7 \\ 3 & 0 & -2 \\ \end{vmatrix}$

a. M_{23} b. M_{32} c. C_{23} d. C_{32}

38. The system of equation $\begin{vmatrix} x+y+z=6 \\ x-2y=-4 \\ \end{vmatrix}$ has no solution then what will be the value of a and b?

A. a=2 & b=16 B. a=-2 & b=16

39. Given matrix $A=\begin{vmatrix} 2 & -1 \\ \end{vmatrix}$ then what will be matrix B such that BA=B+A?

40. If $A=\begin{pmatrix} 2 & 7 \\ \end{pmatrix}$ then $(AB)^{-1}=$_____.

41. Solve $\frac{2-i}{x-yi}=1+\sqrt{-4}$ *then* $x=$_____ & $y=$____

42. Show that the simplified form of $i^{16}-i^{20}+i^{25}$ *is* i.

43. Show that $\overline{\left(\frac{3-4i}{1-2i}\right)}=\sqrt{5}$

44. For a complex number z , solve the equation $z^3+8=0$

45. Show that $|z+2yi|=4$ determine the geometric horizontal ellipse centre at the origin. Assume that $z=x+yi$

46. Which of the following is the simplest form of $\frac{4-3i}{3+4i}+\overline{1-2i}$?

47. The solution set of the equation $x^2-2x+5=0$

48. Polar form of the complex number $z=\left(\frac{2}{1+\sqrt{3}i}\right)^2$ *is*:

A. $z=\cos 120^0+i\sin 120^0$

B. $z=\cos 240^0+i\sin 240^0$

C. $z=\cos 60^0+i\sin 60^0$

D. $z=-\cos 120^0+i\sin 120^0$

49. If $(2x-yi)(3+i)=20i$ then find the value of x and y.

50. The simplified form of $\frac{(1-3i)(5+i)}{1+i}$ *is*:

51. The simplest form of $\frac{2(\cos 16^0+i\sin 16^0)}{3(\cos 44^0+i\sin 44^0).2(\cos 62^0+i\sin 6^{20})}$ *is*:

A. 2i

B. -2i

52. Find the Cartesian coordinates of the point having the given polar coordinate.

a. $\left(2,\frac{3\pi}{2}\right)$

b. $\left(3,\frac{-5\pi}{6}\right)$

53. Write each of the following complex numbers in polar form.

a. $z=6\sqrt{3}+6i$

b. $z=-2i$

54. Given two matrices A & B of different border, to multiply A and B that is to determine AB:

A. number of rows of A should be equal to number of columns of B

B. number of columns of A should be equal to number of rows of A.

C. both must be square matrices

55. Given a system of equations AX=B, where A is the coefficient matrix, X is column variable matrix and B the constant column matrix. If the determinant of the coefficient matrix is zero implies that:

A. the system has many solutions

B. the system has no solutions

C. the system has one solution

D. A & B

56. Let $\mathrm{W} = \frac{8i}{1+i} + \frac{(1-3i)^2}{2}$, then /W/ is equal to

A. 1 B. 2 C. $\sqrt{2}$ D. $\frac{1}{2}$

57. If $Z = x + yi$ is a complex number, then $2|Z|^2 + (Z - \overline{Z})^2 = 2$ is equivalent to which one of the following equations?

A. $x^2 - y^2 = 2$
B. $2x^2 - y^2 = 1$
C. $x^2 - y^2 = 1$
D. $x^2 - 3iy^2 = 1$

58. What is the principal orgumnet of $(-3 - 3i)^{13}$?

A. $\frac{\pi}{2}$ B. $\frac{2\pi}{3}$ C. $\frac{\pi}{4}$ D. $\frac{3\pi}{4}$

59. Which of thae folliwng is False?

A. $\begin{vmatrix} 4 & -2 \\ 1 & -3 \end{vmatrix} = -10$
B. $\begin{vmatrix} 2 & -1 & 0 \\ 0 & 3 & -2 \\ 1 & 0 & 1 \end{vmatrix} = 8$
C. the inverse of $\begin{pmatrix} 3 & 5 \\ 1 & 2 \end{pmatrix} is \begin{pmatrix} 2 & -5 \\ -1 & 3 \end{pmatrix}$
D. the inverse of $\begin{pmatrix} 2 & -3 \\ 4 & -7 \end{pmatrix} is \begin{pmatrix} -3.5 & 1 \\ 2 & -1 \end{pmatrix} 1.5$

60. What is the solution set of the system

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

A. $\varnothing$ B. {(2k + 1, k, k)/k ∈ IR}

B. $\{(0,2,1)\}$ D. {(1 – k, 2k, k)/ k∈IR}