



2nd Semester Final Exam
Grade 11 Subject: Math
Mark: 50%

(2009A.Y.)

Time: 2hr

Instruction- I Write true if the statement is correct and write false if the statement is incorrect.

1. If A and B are 2×2 matrices, then $|A + B| = |A| + |B|$
2. Let $A = \begin{pmatrix} 1 & -2 \\ 2 & -1 \end{pmatrix}$, then $A^2 = -3I_2$
3. The additive inverse of $Z = a + bi$, $a, b \in \mathbb{R}$, $Z \neq 0$ is $Z^{-1} = a - bi$
4. If Z is a complex number, then $Z \cdot \bar{Z} = |Z|^2$
5. $i^7 - i^{10} = 1 - i$
6. If i and j are unit vectors $|i - j| = 0$
7. If $\vec{a} + \vec{b}$ and $\vec{b} - \vec{a}$ are perpendicular, then $|\vec{a}| + |\vec{b}| = 0$
8. If $\vec{u} \cdot \vec{u} > 0$, $\vec{u} \neq 0$ and $\vec{u}$ is a vector
9. $f(x) = \csc x$ is an odd function.
10. $\sin \frac{\pi}{2} - \tan(-5\pi) = 3$

Instruction – II- Choose the best answer.

11. If $\begin{vmatrix} 1 & 4 \\ 3x & x + 22 \end{vmatrix} = 0$. The value of x is
A. 11 B. 2 C. 22 D. 4 E. None
12. Let $A = \begin{pmatrix} 3 & -2 \\ -1 & 3 \end{pmatrix}$ and $A - B = I_2$, then $|B|$ is
A. 6 B. 2 C. -6 D. 7 E. None
13. If $\begin{pmatrix} x & 2 \\ y & x \end{pmatrix} + \begin{pmatrix} 4 & -3 \\ 0 & -1 \end{pmatrix} = \begin{pmatrix} 8-x & -1 \\ 2x & 1 \end{pmatrix}$, then the value of x and y is
A. $x = \frac{1}{y} = -2$ B. $2x = y = 4$ C. $\frac{1}{x} = y = -1$ D. $x = y = 2$ E. None
14. Let $A = \begin{pmatrix} x & -1 \\ 3x & 1 \end{pmatrix}$ and $|2A| = x^2$, the value of x, $x \neq 0$ is
A. 4 B. 16 C. 8 D. 2 E. None
15. If $Z_1 = 2 + i$ and $Z_2 = 1 + 2i$, then $Z_1 \cdot Z_2$ is equal to
A. $i - 1$ B. $5i + 4$ C. $5i$ D. 4 E. None
16. Simplifying $\left| \frac{i-1}{2+i} \right|$ gives
A. $\frac{\sqrt{2}}{5}$ B. $\frac{\sqrt{2}}{\sqrt{5}}$ C. $\frac{5}{\sqrt{2}}$ D. $\frac{\sqrt{2}}{10}$ E. None
17. The solution set of $(2x - yi)(3 + i) = 20i$ is
A. $\{(-2, 4)\}$ B. $\{(1, -6)\}$ C. $\{(5, 3)\}$ D. $\{(-1, 1)\}$ E. None

18. Let $Z=1+\sqrt{3}i$, then $|Z|$ is equal to
 A. 1 B. $\sqrt{2}$ C. 2 D. $\sqrt{3}$ E. None
19. If $Z=3-2i$, then $Z \cdot \bar{Z}$ is equal to
 A. 13 B. 5 C. 10 D. 1 E. None
20. The solution set of $x^2+2=0$ is
 A. $\{-1, 1\}$ B. $\{-i, i\}$ C. $\{-\sqrt{2}i, \sqrt{2}i\}$ D. $\{0, 1\}$ E. None
21. If $|a+b|=5$, $|a|=\sqrt{2}$ and $|b|=1$, then $a \cdot b$ is equal to
 A. 1 B. 11 C. 4 D. 22 E. None
22. Let $\vec{u}=3i+2j$ and, $\vec{v}=-6i-4j$, then the angle between the two vectors is
 A. $-\pi$ B. $\frac{\pi}{4}$ C. $\frac{\pi}{2}$ D. $\frac{-\pi}{6}$ E. None
23. If $T((1, 2))=(5, 8)$, then $T((3, 4))$ is equal to
 A. $(4, 3)$ B. $(6, 10)$ C. $(7, 10)$ D. $(5, 6)$ E. None
24. The image of point p $(3, 5)$ under the line of reflection $\ell: y=mx$ whose inclination is $\frac{\pi}{4}$ is
 A. $(3, 4)$ B. $(5, 3)$ C. $(4, 5)$ D. $(4, 3)$ E. None
25. If the line $x-y=z$ is rotated about the origin through angle $\frac{\pi}{2}$, then its image is
 A. $2x-1=y$ B. $y=-x+2$ C. $y=-x+1$ D. $y=3x-1$ E. None
26. If $y=\sin^{-1}(1/2)$, then the value of y is
 A. $[\frac{-\pi}{2}, \frac{\pi}{2}]$ B. $(-\pi, \pi)$ C. $(-\infty, \infty)$ D. $[\frac{-\pi}{4}, \frac{\pi}{4}]$ E. None
27. The value of $\cos^{-1}(\sin \frac{\pi}{2})$ is
 A. π B. $\frac{3}{2}\pi$ C. $-\pi$ D. 2π E. None
28. The solution set of $\tan x - \sec x = 1$ is
 A. $\{0, \pi\}$ B. $\{-\pi, 0\}$ C. $\{\pi\}$ D. $\{0\}$ E. None
29. If $x = \sin^{-1}(\frac{1}{2})$, then the value of $\cos 2x$ is
 A. $\frac{\sqrt{3}}{2}$ B. $\frac{1}{2}$ C. $\sqrt{3}$ D. 1 E. None
30. If $\cos x = \frac{-1}{2}$ and x is second quadrant, then $\tan(\frac{1}{2}x)$ is equal to
 A. $-\sqrt{3}$ B. $\frac{\sqrt{2}}{2}$ C. $\frac{-1}{2}$ D. -1 E. None

Instruction–III. Give short answer

31. If $A = \begin{pmatrix} 1 & -1 & 1 \\ -1 & 0 & -1 \end{pmatrix}$ and $B = \begin{pmatrix} 2 & -1 \\ 1 & 0 \\ -1 & -2 \end{pmatrix}$ Then $A.B = \underline{\hspace{2cm}}$
32. Given, $Z = i+1$, the polar form of $Z = \underline{\hspace{2cm}}$

Instruction – IV- Workout, show the necessary steps

33. Find the equation of the tangent line to the circle $x^2+y^2=8$ at $(-2, -2)$
34. If L: $AX + BY + C=0$ is translation line which takes the point $(3, 5)$ to $(-7, -9)$. Find equation of L.
35. If $\sin\theta = \frac{12}{13}$ and θ lies in quadrant II, Find $\csc\theta - \cot\theta$
36. Show that $\tan \theta = \frac{1 - \cos 2\theta}{\sin 2\theta}$

ANSWER SHEET

NAME _____ SECTION _____ ROLL NO _____

1		11		2		3	
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2		12		2		3	_____
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