## SUMMER PRACTISE QUESTIONS IN MATHEMATICS(XII Science)

## VERY SHORT ANSWER TYPE QUESTIONS (1 Mark)

1. If $\left[\begin{array}{cc}x+3 & 4 \\ y-4 & x+y\end{array}\right]=\left[\begin{array}{ll}5 & 4 \\ 3 & 9\end{array}\right]$, find $x$ and $y$.
2. If $A=\left[\begin{array}{cc}i & 0 \\ 0 & -i\end{array}\right]$ and $B=\left[\begin{array}{cc}0 & i \\ i & 0\end{array}\right]$, find $A B$.
3. Find the value of $a_{23}+a_{32}$ in the matrix $A=\left[a_{i j}\right]_{3 \times 3}$

$$
\text { where } a_{i j}= \begin{cases}|2 i-j| & \text { if } i>j \\ -i+2 j+3 & \text { if } i \leq j\end{cases}
$$

4. If $B$ be a $4 \times 5$ type matrix, then what is the number of elements in the third column.
5. If $A=\left[\begin{array}{ll}5 & 2 \\ 0 & 9\end{array}\right]$ and $B=\left[\begin{array}{cc}3 & 6 \\ 0 & -1\end{array}\right]$ find $3 A-2 B$.
6. If $A=\left[\begin{array}{cc}2 & -3 \\ -7 & 5\end{array}\right]$ and $B=\left[\begin{array}{cc}1 & 0 \\ 2 & -6\end{array}\right]$ find $(A+B)^{\text {. }}$.
7. If $A=\left[\begin{array}{lll}1 & 0 & 4\end{array}\right]$ and $B=\left[\begin{array}{l}2 \\ 5 \\ 6\end{array}\right]$ find $A B$.
8. If $A=\left[\begin{array}{cc}4 & x+2 \\ 2 x-3 & x+1\end{array}\right]$ is symmetrix matrix, then find $x$.
9. For what value of $x$ the matrix $\left[\begin{array}{rrr}0 & 2 & -3 \\ -2 & 0 & -4 \\ 3 & 4 & x+5\end{array}\right]$ is skew symmetrix matrix.
10. If $A=\left[\begin{array}{ll}2 & 3 \\ 1 & 0\end{array}\right]=P+Q$ where $P$ is symmetric and $Q$ is skew-symmetric matrix, then find the
matrix $Q$.
11. Find the value of $\left|\begin{array}{cc}a+i b & c+i d \\ -c+i d & a-i b\end{array}\right|$
12. If $\left|\begin{array}{ll}2 x+5 & 3 \\ 5 x+2 & 9\end{array}\right|=0$, find $x$.
13. For what value of $K$, the matrix $\left[\begin{array}{ll}k & 2 \\ 3 & 4\end{array}\right]$ has no inverse.
14. If $A=\left[\begin{array}{rr}\sin 30^{\circ} & \cos 30^{\circ} \\ -\sin 60^{\circ} & \cos 60^{\circ}\end{array}\right]$, what is $|A|$.
15. Find the cofactor of $a_{12}$ in $\left|\begin{array}{ccc}2 & -3 & 5 \\ 6 & 0 & 4 \\ 1 & 5 & -7\end{array}\right|$.
16. Find the minor of $a_{23}$ in $\left|\begin{array}{rrr}1 & 3 & -2 \\ 4 & -5 & 6 \\ 3 & 5 & 2\end{array}\right|$.
17. Find the value of $P$, such that the matrix $\left[\begin{array}{rr}-1 & 2 \\ 4 & P\end{array}\right]$ is singular.
18. Find the value of $x$ such that the points $(0,2),(1, x)$ and $(3,1)$ are collinear.
19. Area of a triangle with vertices $(k, 0),(1,1)$ and $(0,3)$ is 5 unit. Find the value $(s)$ of $k$.
20. If $A$ is a square matrix of order 3 and $|A|=-2$, find the value of $|-3 A|$.
21. If $A=2 B$ where $A$ and $B$ are of square matrices of order $3 \times 3$ and $|B|=5$. What is $|A|$ ?
22. What is the condition that a system of equation $A X=B$ has no solution.
23. Find the area of the triangle with vertices $(0,0),(6,0)$ and $(4,3)$.
24. If $\left|\begin{array}{rr}2 x & 4 \\ -1 & x\end{array}\right|=\left|\begin{array}{rr}6 & -3 \\ 2 & 1\end{array}\right|$, find $x$.
25. If $A=\left|\begin{array}{ccc}x+y & y+z & z+x \\ z & x & y \\ 1 & 1 & 1\end{array}\right|$, write the value of $\operatorname{det} A$.
26. If $A=\left[\begin{array}{ll}a_{11} & a_{12} \\ a_{21} & a_{22}\end{array}\right]$ such that $|A|=-15$, find $a_{11} C_{21}+a_{12} C_{22}$ where $C_{i j}$ is cofactors of $a_{i j}$ in $A=\left[a_{i j}\right]$.
27. If $A$ is a non-singular matrix of order 3 and $|A|=-3$ find $|\operatorname{adj} A|$.
28. If $A=\left[\begin{array}{cc}5 & -3 \\ 6 & 8\end{array}\right]$ find $(\operatorname{adj} A)$
29. Given a square matrix $A$ of order $3 \times 3$ such that $|A|=12$ find the value of $\mid A$ adj $A \mid$.
30. If $A$ is a square matrix of order 3 such that $|\operatorname{adj} A|=8$ find $|A|$.
31. Let $A$ be a non-singular square matrix of order $3 \times 3$ find $|\operatorname{adj} A|$ if $|A|=10$.
32. If $A=\left[\begin{array}{cc}2 & -1 \\ 3 & 4\end{array}\right]$ find $\left|\left(A^{-1}\right)^{-1}\right|$.
33. If $A=\left[\begin{array}{lll}-1 & 2 & 3\end{array}\right]$ and $B:\left[\begin{array}{r}3 \\ -4 \\ 0\end{array}\right]$ find $|A B|$.

## SHORT ANSWER TYPE QUESTIONS (4 MARKS)

34. Find $x, y, z$ and $w$ if $\left[\begin{array}{cc}x-y & 2 x+z \\ 2 x-y & 3 x+w\end{array}\right]=\left[\begin{array}{cc}-1 & 5 \\ 0 & 13\end{array}\right]$.
35. Construct a $3 \times 2$ matrix $A=\left[a_{i j}\right]$ whose elements are given by $a_{i j}= \begin{cases}1+i+j & \text { if } i \geq j \\ \frac{|i-2 j|}{2} & \text { if } i<j\end{cases}$
36. Find $A$ and $B$ if $2 A+3 B=\left[\begin{array}{ccc}1 & -2 & 3 \\ 2 & 0 & -1\end{array}\right]$ and $A-2 B=\left[\begin{array}{ccc}3 & 0 & 1 \\ -1 & 6 & 2\end{array}\right]$.
37. If $A=\left[\begin{array}{r}-1 \\ 2 \\ 3\end{array}\right]$ and $B=\left[\begin{array}{lll}-2 & -1 & -4\end{array}\right]$, verify that $(A B)^{\prime}=B^{\prime} A^{\prime}$.
38. Express the matrix $\left[\begin{array}{rrr}3 & 3 & -1 \\ -2 & -2 & 1 \\ -4 & -5 & 2\end{array}\right]=P+Q$ where $P$ is a symmetric and $Q$ is a skew-symmetric matrix.
39. If $\left[\begin{array}{cc}\cos \theta & \sin \theta \\ -\sin \theta & \cos \theta\end{array}\right]$, verify prove that $A^{n}=\left[\begin{array}{cc}\cos n \theta & \sin n \theta \\ -\sin n \theta & \cos n \theta\end{array}\right]$ where $n$ is a natural number.
40. Let $A=\left[\begin{array}{rr}2 & -1 \\ 3 & 4\end{array}\right], B=\left[\begin{array}{ll}5 & 2 \\ 7 & 4\end{array}\right], C=\left[\begin{array}{ll}2 & 5 \\ 3 & 8\end{array}\right]$, find a matrix $D$ such that $C D-A B=O$.
41. Find the value of $x$ such that $\left[\begin{array}{lll}1 & x & 1\end{array}\right]\left[\begin{array}{rrr}1 & 3 & 2 \\ 2 & 5 & 1 \\ 15 & 3 & 2\end{array}\right]\left[\begin{array}{l}1 \\ 2 \\ x\end{array}\right]=0$
42. Prove that the product of the matrices $\left[\begin{array}{ll}\cos ^{2} \theta & \cos \theta \sin \theta \\ \cos \theta \sin \theta & \sin ^{2} \theta\end{array}\right]$ and $\left[\begin{array}{ll}\cos ^{2} \phi & \cos \phi \sin \phi \\ \cos \phi \sin \phi & \sin ^{2} \phi\end{array}\right]$ is the null matrix, when $\theta$ and $\phi$ differ by an odd multiple of $\frac{\pi}{2}$.
43. If $A=\left[\begin{array}{rr}5 & 3 \\ 12 & 7\end{array}\right]$ show that $A^{2}-12 A-I=0$. Hence find $A^{-1}$.
44. If $A=\left[\begin{array}{ll}2 & 3 \\ 4 & 7\end{array}\right]$ find $f(A)$ where $f(x)=x^{2}-5 x-2$.
45. If $A=\left[\begin{array}{ll}4 & 3 \\ 2 & 5\end{array}\right]$, find $x$ and $y$ such that $A^{2}-x A+y l=0$.
46. Find the matrix $x$ so that $x\left[\begin{array}{lll}1 & 2 & 3 \\ 4 & 5 & 6\end{array}\right]=\left[\begin{array}{rrr}-7 & -8 & -9 \\ 2 & 4 & 6\end{array}\right]$.
47. If $A=\left[\begin{array}{rr}2 & 3 \\ 1 & -4\end{array}\right]$ and $B=\left[\begin{array}{rr}1 & -2 \\ -1 & 3\end{array}\right]$ then show that $(A B)^{-1}=B^{-1} A^{-1}$.
48. Test the consistency of the following system of equations by matrix method :

$$
3 x-y=5 ; 6 x-2 y=3
$$

49. Using elementary row transformations, find the inverse of the matrix $A=\left[\begin{array}{rr}6 & -3 \\ -2 & 1\end{array}\right]$, if possible.
50. By using elementary column transformation, find the inverse of $A=\left[\begin{array}{ll}3 & 1 \\ 5 & 2\end{array}\right]$.
51. If $A=\left[\begin{array}{rr}\cos \alpha & -\sin \alpha \\ \sin \alpha & \cos \alpha\end{array}\right]$ and $A+A^{\prime}=I$, then find the general value of $\alpha$.

Using properties of determinants, prove the following : Q 52 to $Q 59$.
52. $\left|\begin{array}{ccc}a-b-c & 2 a & 2 a \\ 2 b & b-c-a & 2 b \\ 2 c & 2 c & c-a-b\end{array}\right|=(a+b+c)^{3}$
53. $\left|\begin{array}{lll}x+2 & x+3 & x+2 a \\ x+3 & x+4 & x+2 b \\ x+4 & x+5 & x+2 c\end{array}\right|=0$ if $a, b, c$ are in A.P.
54. $\left|\begin{array}{ccc}\sin \alpha & \cos \alpha & \sin (\alpha+\delta) \\ \sin \beta & \cos \beta & \sin (\beta+\delta) \\ \sin \gamma & \cos \gamma & \sin (\gamma+\delta)\end{array}\right|=0$
55. $\left|\begin{array}{ccc}b^{2}+c^{2} & a^{2} & a^{2} \\ b^{2} & c^{2}+a^{2} & b^{2} \\ c^{2} & c^{2} & a^{2}+b^{2}\end{array}\right|=4 a^{2} b^{2} c^{2}$.
56. $\left|\begin{array}{lll}b+c & c+a & a+b \\ q+r & r+p & p+q \\ y+z & z+x & x+y\end{array}\right|=2\left|\begin{array}{lll}a & b & c \\ p & q & r \\ x & y & z\end{array}\right|$.
57. $\left|\begin{array}{ccc}a^{2} & b c & a c+c^{2} \\ a^{2}+a b & b^{2} & a c \\ a b & b^{2}+b c & c^{2}\end{array}\right|=4 a^{2} b^{2} c^{2}$.
58. $\left|\begin{array}{ccc}x+a & b & c \\ a & x+b & c \\ a & b & x+c\end{array}\right|=x^{2}(x+a+b+c)$.
59. Show that :

$$
\left|\begin{array}{lll}
x & y & z \\
x^{2} & y^{2} & z^{2} \\
y z & z x & x y
\end{array}\right|=(y-z)(z-x)(x-y)(y z+z x+x y)
$$

60. (i) If the points $(a, b)\left(a^{\prime}, b^{\prime}\right)$ and $\left(a-a^{\prime}, b-b^{\prime}\right)$ are collinear. Show that $a b^{\prime}=a^{\prime} b$.
(ii) If $A=\left[\begin{array}{ll}2 & 5 \\ 2 & 1\end{array}\right]$ and $B=\left[\begin{array}{cc}4 & -3 \\ 2 & 5\end{array}\right]$ verity that $|A B|=|A||B|$.
61. Given $A=\left[\begin{array}{lll}0 & -1 & 2 \\ 2 & -2 & 0\end{array}\right]$ and $B=\left[\begin{array}{ll}0 & 1 \\ 1 & 0 \\ 1 & 1\end{array}\right]$. Find the product $A B$ and also find $(A B)^{-1}$.
62. Solve the following equation for $x$.

$$
\left|\begin{array}{lll}
a+x & a-x & a-x \\
a-x & a+x & a-x \\
a-x & a-x & a+x
\end{array}\right|=0
$$

63. Verify that $(A B)^{-1}=B^{-1} A^{-1}$ for the matrices $A=\left[\begin{array}{ll}2 & 1 \\ 5 & 3\end{array}\right]$ and $B=\left[\begin{array}{ll}4 & 5 \\ 3 & 4\end{array}\right]$.
64. Using matrix method to solve the following system of equations : $5 x-7 y=2,7 x-5 y=3$.

## LONG ANSWER TYPE QUESTIONS (6 MARKS)

65. Obtain the inverse of the following matrix using elementary row operations $A=\left[\begin{array}{lll}0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1\end{array}\right]$.
66. Use product $\left[\begin{array}{rrr}1 & -1 & 2 \\ 0 & 2 & -3 \\ 3 & -2 & 4\end{array}\right]\left[\begin{array}{rrr}-2 & 0 & 1 \\ 9 & 2 & -3 \\ 6 & 1 & -2\end{array}\right]$ to solve the system of equations $x-y+2 z=1,2 y-3 z=1,3 x-2 y+4 z=2$.
67. Solve the following system of equations by matrix method, where $x \neq 0, y \neq 0, z \neq 0$

$$
\frac{2}{x}-\frac{3}{y}+\frac{3}{z}=10, \frac{1}{x}+\frac{1}{y}+\frac{1}{z}=10, \frac{3}{x}-\frac{1}{y}+\frac{2}{z}=13
$$

68. Find $A^{-1}$, where $A=\left[\begin{array}{ccc}1 & 2 & -3 \\ 2 & 3 & 2 \\ 3 & -3 & -4\end{array}\right]$, hence solve the system of linear equations :

$$
\begin{aligned}
x+2 y-3 z & =-4 \\
2 x+3 y+2 z & =2 \\
3 x-3 y-4 z & =11
\end{aligned}
$$

69. The sum of three numbers is 2 . If we subtract the second number from twice the first number, we get 3 . By adding double the second number and the third number we get 0 . Represent it algebraically and find the numbers using matrix method.
70. Compute the inverse of the matrix.

$$
A=\left[\begin{array}{ccc}
3 & -1 & 1 \\
-15 & 6 & -5 \\
5 & -2 & 5
\end{array}\right] \text { and verify that } A^{-1} A=I_{3}
$$

71. If the matrix $A=\left[\begin{array}{ccc}1 & 1 & 2 \\ 0 & 2 & -3 \\ 3 & -2 & 4\end{array}\right]$ and $B^{-1}=\left[\begin{array}{ccc}1 & 2 & 0 \\ 0 & 3 & -1 \\ 1 & 0 & 2\end{array}\right]$, then compute $(A B)^{-1}$.
72. Using matrix method, solve the following system of linear equations :

$$
2 x-y=4,2 y+z=5, z+2 x=7
$$

73. Find $A^{-1}$ if $A=\left[\begin{array}{lll}0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0\end{array}\right]$. Also show that $A^{-1}=\frac{A^{2}-3 l}{2}$.
74. Find the inverse of the matrix $A=\left[\begin{array}{rrr}1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1\end{array}\right]$ by using elementary column transformations.
75. Let $A=\left[\begin{array}{rr}2 & 3 \\ -1 & 2\end{array}\right]$ and $f(x)=x^{2}-4 x+7$. Show that $f(A)=0$. Use this result to find $A^{5}$.
76. If $A=\left[\begin{array}{ccc}\cos \alpha & -\sin \alpha & 0 \\ \sin \alpha & \cos \alpha & 0 \\ 0 & 0 & 1\end{array}\right]$, verify that $A \cdot(\operatorname{adj} A)=(\operatorname{adj} A) \cdot A=|A| I_{3}$.
77. For the matrix $A=\left[\begin{array}{rrr}2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2\end{array}\right]$, verify that $A^{3}-6 A^{2}+9 A-4 I=0$, hence find $A^{-1}$.
78. Find the matrix $X$ for which

$$
\left[\begin{array}{ll}
3 & 2 \\
7 & 5
\end{array}\right] \cdot X \cdot\left[\begin{array}{ll}
-1 & 1 \\
-2 & 1
\end{array}\right]=\left[\begin{array}{rr}
2 & -1 \\
0 & 4
\end{array}\right]
$$

79. By using properties of determinants prove the following :

$$
\left|\begin{array}{ccc}
1+a^{2}-b^{2} & 2 a b & -2 b \\
2 a b & 1-a^{2}+b^{2} & 2 a \\
2 b & -2 a & 1-a^{2}-b^{2}
\end{array}\right|=\left(1+a^{2}+b^{2}\right)^{3} .
$$

80. $\left|\begin{array}{ccc}(y+z)^{2} & x y & z x \\ x y & (x+z)^{2} & y z \\ x z & y z & (x+y)^{2}\end{array}\right|=2 x y z(x+y+z)^{3}$.
81. $\left|\begin{array}{ccc}a & a+b & a+b+c \\ 2 a & 3 a+2 b & 4 a+3 b+2 c \\ 3 a & 6 a+3 b & 10 a+6 b+3 c\end{array}\right|=a^{3}$.
82. If $x, y, z$ are different and $\left|\begin{array}{lll}x & x^{2} & 1+x^{3} \\ y & y^{2} & 1+y^{3} \\ z & z^{2} & 1+z^{3}\end{array}\right|=0$. Show that $x y z=-1$.

## H.O.T.S.

83. If a matrix $A$ has 11 elements, what is its possible order?
84. Given a square matrix $A$ of order $3 \times 3$, such that $|A|=-5$, find the value of $\mid A$. adj $A \mid$.
85. If $|A|=3$ and $A=\left[a_{i j}\right]_{3 \times 3}$ and $c_{i j}$ the cofactors of $a_{i j}$ then what is the value of $a_{13} c_{13}+a_{23} c_{23}+$ $a_{33} c_{23}$.
86. What is the number of all possible matrices of order $2 \times 3$ with each entry 0,1 on 2 .

## SHORT ANSWER TYPE QUESTIONS (4 MARKS)

87. If $A=\left[\begin{array}{cc}0 & -\tan \frac{\alpha}{2} \\ \tan \frac{\alpha}{2} & 0\end{array}\right]$ and $I$ is the identity matrix of order 2 , show that

$$
I+A=(I-A)\left[\begin{array}{cc}
\cos \alpha & -\sin \alpha \\
\sin \alpha & \cos \alpha
\end{array}\right]
$$

88. If $F(\theta)=\left[\begin{array}{ccc}\cos \theta & -\sin \theta & 0 \\ \sin \theta & \cos \theta & 0 \\ 0 & 0 & 1\end{array}\right]$, show that $F(\theta) F(\phi)=F(\theta+\phi)$.
89. Let $A=\left[\begin{array}{ll}0 & 1 \\ 0 & 0\end{array}\right]$, show that $(a l+b A)^{n}=a^{n} I+n a^{n-1} b A$, where $I$ is the identity matrix of order 2 and $n \in N$.
90. If $x, y, z$ are the $10^{\text {th }}, 13^{\text {th }}$ and $15^{\text {th }}$ terms of a G.P. find the value of $\Delta=\left|\begin{array}{lll}\log x & 10 & 1 \\ \log y & 13 & 1 \\ \log z & 15 & 1\end{array}\right|$.
91. Using properties of determinants, show that

$$
\left|\begin{array}{lll}
(b+c)^{2} & a^{2} & b c \\
(c+a)^{2} & b^{2} & c a \\
(a+b) & c^{2} & a b
\end{array}\right|=(a-b)(b-c)(c-a)(a+b+c)\left(a^{2}+b^{2}+c^{2}\right) .
$$

## LONG ANSWER TYPE QUESTIONS (6 MARKS)

92. Using properties of determinants prove that $\left|\begin{array}{lll}-b c & b^{2}+b c & c^{2}+b c \\ a^{2}+a c & -a c & c^{2}+a c \\ a^{2}+a b & b^{2}+a b & -a b\end{array}\right|=(a b+b c+c a)^{3}$
93. If $A=\left|\begin{array}{rrr}3 & 2 & 1 \\ 4 & -1 & 2 \\ 7 & 3 & -3\end{array}\right|$, find $A^{-1}$ and hence solve the system of equations $3 x+4 y+7 z=14,2 x-y+3 z=4, x+2 y-3 z=0$.
94. 

Show that

$$
\left|\begin{array}{ccc}
a_{1} & a_{2} & a_{3} \\
b_{1} & b_{2} & b_{3} \\
c_{1} x+d_{1} & c_{2} x+d_{2} & c_{3} x+d_{3}
\end{array}\right|=x\left|\begin{array}{ccc}
a_{1} & a_{2} & a_{3} \\
b_{1} & b_{2} & b_{3} \\
c_{1} & c_{2} & c_{3}
\end{array}\right|+\left|\begin{array}{ccc}
a_{1} & a_{2} & a_{3} \\
b_{1} & b_{2} & b_{3} \\
d_{1} & d_{2} & d_{3}
\end{array}\right|
$$

95. 

Which of the following matrices are symmetric and skewsymmetric
(i) $\left[\begin{array}{ccc}2 & 6 & 7 \\ 6 & -2 & 3 \\ 7 & 3 & 0\end{array}\right]$
(ii) $\left[\begin{array}{ccc}0 & 3 & -5 \\ -3 & 0 & 6 \\ 5 & -6 & 0\end{array}\right]$
(iii) $\left[\begin{array}{lll}\text { a } & b & c \\ b & d & e \\ c & e & f\end{array}\right]$
96. A trust fund has 30000 that must be invested in two different types of bonds. The first bond pays $5 \%$ interest per year and the second bond pays $7 \%$ interest per year. Using matrix multiplication, determine how to divide 30000 among the two types of bonds if the trust fund must obtain an annual total interest of 1800
(a) 25000 each
(b) 5000 each
(c) 15000 each
(d) 5000, 25000
97. If the system of linear equation $x+2 a y+a z=0, x+3 b y+b z=0, x+4 c y+c z=0$ has a non zero solution, then $\mathrm{a}, \mathrm{b}, \mathrm{c}$
(a) Are in A.P.
(b) Are in G. P.
(c) Are in H. P.
(d) Satisfy $a+2 b+3 c=0$
98. If a matrix $A$ is such that $3 \mathrm{~A}^{3}+2 \mathrm{~A}^{2}+5 \mathrm{~A}+\mathrm{I}=0$ then its inverse is
(a) $-\left(3 \mathrm{~A}^{2}+2 \mathrm{~A}+5 \mathrm{I}\right)$
(b) $3 A^{2}+2 A+5 I$
(c) $3 \mathrm{~A}^{2}-2 \mathrm{~A}-5 \mathrm{I}$
(d) None of these
99. If $A$ and $B$ are square matrices of order 3 such that $|\mathrm{A}|=-1,|\mathrm{~B}|=3$, then $|3 \mathrm{AB}|=$
(a) -9
(b) -81
(c) -27
(d) 81
100. If $|A|$ denotes the value of the determinant of the square matrix $A$ of order 3 , then $|-2 A|=$ (a) $-8|\mathrm{~A}|$
(b) $8|\mathrm{~A}|$
(c) $-2|\mathrm{~A}|$
(d) None of these

## ANSWERS

1. $x=2, y=7$
2. 11. 
1. $\left[\begin{array}{ll}9 & -6 \\ 0 & 29\end{array}\right]$.
2. $A B=[26]$.
3. $x=-5$
4. $a^{2}+b^{2}+c^{2}+d^{2}$.
5. $K=\frac{3}{2}$.
6. 46
7. $P=-8$
8. $\left[\begin{array}{cc}0 & -1 \\ 1 & 0\end{array}\right]$
9. 4
10. $\left[\begin{array}{cc}3 & -5 \\ -3 & -1\end{array}\right]$.
11. $x=5$
12. $\left[\begin{array}{rr}0 & 1 \\ -1 & 0\end{array}\right]$.
13. $x=-13$
14. $|A|=1$.
15. -4
16. $x=\frac{5}{3}$.
17. $k=\frac{10}{3}$.
18. 40. 
1. 9 sq. units
2. 0
3. 9
4. 1728
5. 100
6. $|A B|=-11$
7. $\left[\begin{array}{cc}3 & \frac{3}{2} \\ 4 & 5 \\ \frac{1}{2} & \frac{1}{2}\end{array}\right]$.
8. $\quad D=\left[\begin{array}{cc}-191 & -110 \\ 77 & 44\end{array}\right]$.
9. $\quad A^{-1}=\left[\begin{array}{rr}-7 & 3 \\ 12 & -5\end{array}\right]$.
10. 54. 
1. $|A|=0,(\operatorname{adj} A) . B \neq 0$
2. $x= \pm 2$
3. 0
4. $\left[\begin{array}{rr}8 & 3 \\ -6 & 5\end{array}\right]$.
5. $|A|=9$
6. 11
7. $x=1, y=2, z=3, w=4$
8. $A=\left[\begin{array}{rrr}\frac{11}{7} & -\frac{9}{7} & \frac{9}{7} \\ \frac{1}{7} & \frac{18}{7} & \frac{4}{7}\end{array}\right], B=\left[\begin{array}{rrr}-\frac{5}{7} & -\frac{2}{7} & \frac{1}{7} \\ \frac{4}{7} & -\frac{12}{7} & -\frac{5}{7}\end{array}\right]$
9. $x=-2$ or $x-14$
10. $f(A)=0$
11. $x=9, y=14$
12. Inconsistent
13. $\quad A^{-1}=\left[\begin{array}{rr}2 & -1 \\ -5 & 3\end{array}\right]$.
14. $x=\left[\begin{array}{rr}1 & -2 \\ 2 & 0\end{array}\right]$.
15. Inverse does not exist.
16. $\alpha=2 n \pi \pm \frac{\pi}{3}, n \in Z$
17. $\quad A B=\left[\begin{array}{cc}1 & 2 \\ -2 & 2\end{array}\right], \quad(A B)^{-1}=\frac{1}{6}\left[\begin{array}{ll}2 & -2 \\ 2 & -1\end{array}\right]$.
18. $x=\frac{11}{24}, y=\frac{1}{24}$.
19. $\quad A^{-1}=\left[\begin{array}{rrr}\frac{1}{2} & -\frac{1}{2} & \frac{1}{2} \\ -4 & 3 & -1 \\ \frac{5}{2} & -\frac{3}{2} & \frac{1}{2}\end{array}\right]$.
20. $x=0, y=5, z=3$
21. $x=\frac{1}{2}, y=\frac{1}{3}, z=\frac{1}{5}$
22. $x=1, y=-2, z=2$
23. $\quad A^{-1}=-\frac{1}{67}\left[\begin{array}{rrr}-6 & 17 & 13 \\ 14 & 5 & -8 \\ -15 & 9 & -1\end{array}\right]$
24. $A^{-1}=\left[\begin{array}{rrr}2 & 0 & -1 \\ 5 & 1 & 0 \\ 0 & 1 & 3\end{array}\right]$
25. $(A B)^{-1}=\frac{1}{19}\left[\begin{array}{rrr}16 & 12 & 1 \\ 21 & 11 & -7 \\ 10 & -2 & 3\end{array}\right]$.
26. $x=3, y=2, z=1$.
27. $\quad A^{-1}=\frac{1}{2}\left[\begin{array}{rrr}-1 & 1 & 1 \\ 1 & -1 & 1 \\ 1 & 1 & -1\end{array}\right]$.
28. $\quad A^{-1}=\left[\begin{array}{lll}3 & 2 & 6 \\ 1 & 1 & 2 \\ 2 & 2 & 5\end{array}\right]$
29. $\quad A^{5}=\left[\begin{array}{rr}-118 & -93 \\ 31 & -118\end{array}\right]$.
30. $A^{-1}=\frac{1}{4}\left[\begin{array}{ccc}3 & 1 & -1 \\ 1 & 3 & 1 \\ -1 & 1 & 3\end{array}\right]$.
31. $\quad A^{5}=\left[\begin{array}{rr}-118 & -93 \\ 31 & -118\end{array}\right]$.
32. $\quad x=\left[\begin{array}{rr}-16 & 3 \\ 24 & -5\end{array}\right]$.
33. -125
34. 729
35. $x=1, y=1, z=1$.
36. $A^{-1}=\frac{1}{4}\left[\begin{array}{ccc}3 & 1 & -1 \\ 1 & 3 & 1 \\ -1 & 1 & 3\end{array}\right]$.
37. $11 \times 1,1 \times 11$
38. 3
39. 0
40. 

(i) Symmetric
(ii) Skew-symmetric
(iii) Symmetric
96. (C)
97.(C)
98.(a)
99.(b)
100.(a)

