RAVI MATHS TUITION CENTER, NEAR VILLIVAKKAM RLY STATION, CHENNAI – 82. WHATSAPP - 8056206308

VERY IMPORTANT 2 MARKS FOR SLOW LEARNERS

Date : 04-Mar-20

12th Standard

Maths

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MY YOUTUBE CHANNEL NAME- SR MATHS TEST PAPERS

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Exam Time : 01:00:00 Hrs | Total Marks : 110

55 x 2 = 110

1) If adj A = $\begin{bmatrix} -1 & 2 & 2 \\ 1 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$, find A^{-1}.

2) Reduce the matrix $\begin{bmatrix} 3 & -1 & 2 \\ -6 & 2 & 4 \\ -3 & 1 & 2 \end{bmatrix}$ to a row-echelon form.

3) Solve the following system of homogenous equations.
$2x + 3y - z = 0$, $x - y - 2z = 0$, $3x + y + 3z = 0$

4) Find the rank of each of the following matrices:
$\begin{bmatrix} 4 & 3 & 1 & -2 \\ -3 & -1 & -2 & 4 \\ 6 & 7 & -1 & 2 \end{bmatrix}$

5) Simplify $\left(\frac{1+i}{1-i}\right)^3 - \left(\frac{1-i}{1+i}\right)^3$

6) Which one of the points $i, -2+i$, and 3 is farthest from the origin?

7) Find the square root of $6-8i$.

8) Write in polar form of the following complex numbers
$2 + i2\sqrt{3}$

9) Find the value of $\sum_{k=1}^{8} \left(cos\frac{2k\pi}{9} + isin\frac{2k\pi}{9}\right)$.

10) Simplify the following
$i\, i^2 i^3 \ldots i^{2000}$

11) Show that the following equations represent a circle, and, find its centre and radius
$|3z-6+12i|=8$

12) Show that, if p,q,r are rational, the roots of the equation
$x^2-2px+p^2-q^2+2qr-r^2=0$ are rational.

13) Solve the equation : $x^4-14x^2+45 =0$

14) Determine the number of positive and negative roots of the equation $x^9-5x^4-14x^2=0$.

15) Construct a cubic equation with roots 1,1, and −2

16) Find all the values of x such that
$-10\pi \leq x \leq 10\pi$ and sin x=0

17) Find the value of
$2cos^{-1}\left(\frac{1}{2}\right) + sin^{-1}\left(\frac{1}{2}\right)$

18) Prove that
$itan^{-1}(\frac{2}{11}) + tan^{-1}(\frac{7}{24}) = tan^{-1}(\frac{1}{2})$

19) Prove that $\tan^{-1} x+\tan^{-1} z=\tan^{-1}\left[\frac{x+y+z-xyz}{1-xy-yz-zx}\right]$

20) If $\tan^{-1} x+\tan^{-1}y+\tan^{-1}z=\pi$, show that x+y+z+=xyz

21) Find the value of
$cos\left[\frac{1}{2}cos^{-1}\left(\frac{1}{8}\right)\right]$

22) If y=4x+c is a tangent to the circle $x^2+y^2=9$, find c .

23) Find the equation of the circle with centre (2,-1) and passing through the point (3,6) in standard form.

24) Find the vertices, foci for the hyperbola $9x^2-16y^2=144$.

25) Find centre and radius of the following circles.
$2x^2+2y^2-6x+4y+2=0$

26) If $\vec{a}, \vec{b}, \vec{c}$ are three vectors, prove that $[\vec{a}+\vec{c}, \vec{a}+\vec{b}, \vec{a}+\vec{b}+\vec{c}] = [\vec{a}, \vec{b}, \vec{c}]$

27) If $\vec{a} = \hat{i} - 2\hat{j} + 3\hat{k}, \vec{6} = 2\hat{i} + \hat{j} - 2\hat{k}, \vec{c} = 3\hat{i} + 2\hat{j} + \hat{k}$ find $\vec{a}.(\vec{b} \times \vec{c})$.

28) The volume of the parallelepiped whose coterminus edges are
$7\hat{i} + \lambda\hat{j} - 3\hat{k}, \hat{i} + 2\hat{j} - \hat{k}, -3\hat{i} + 7\hat{j} + 5\hat{k}$ is 90 cubic units. Find the value of λ.

29) Show that the lines $\frac{x-1}{4} = \frac{2-y}{6} = \frac{z-4}{12}$ and $\frac{x-1}{4} = \frac{2-y}{6} = \frac{z-4}{12}$ are parallel.

30) A variable plane moves in such a way that the sum of the reciprocals of its intercepts on the coordinate axes is a constant. Show that the plane passes through a fixed point

31) Find the angle between the straight line $\vec{r} = (2\hat{i} + \hat{j} + \hat{k}) + t(\hat{i} - \hat{j} + \hat{k})$ and the plane 2x-y+z=5

32) Find the length of the perpendicular from the point (1, -2, 3) to the plane x - y + z =5.

33) Find the distance between the parallel planes x+2y-2z=0 and 2x+4y-4z+5=0

34) Find the angle between the following lines.
2x = 3y = −z and 6x = − y = −4z.

35) Find two positive numbers whose sum is 12 and their product is maximum.

36) Find two positive numbers whose product is 20 and their sum is minimum.

37) Evaluate the following limit, if necessary use l'Hôpital Rule
$\lim_{x\to 0} \frac{1-cosx}{x^2}$

38) Evaluate the following limit, if necessary use l'Hôpital Rule
$\lim_{x\to\infty} \frac{2x^2-3}{x^2-5x+3}$

39) Prove that the function f (x) = x^2 + 2 is strictly increasing in the interval (2,7) and strictly decreasing in the interval (−2, 0)

40) Prove that the function f (x) = x^2 − 2x − 3 is strictly increasing in $(2, \infty)$

41) Find the partial derivatives of the following functions at the indicated point
g(x,y) =$3x^2 + y^2 + 5x + 2$, (1,-2)

42) If w(x, y, z) = x^2 y + y^2z + z^2x, x, y, z∈R, find the differential dw .

43) A differential equation, determine its order, degree (if exists)

$$\left(\frac{d^3y}{dx^3}\right)^{\frac{2}{3}} - 3\frac{d^2y}{dx^2} + 5\frac{dy}{dx} + 4 = 0$$

44) A differential equation, determine its order, degree (if exists)

$$y\left(\frac{dy}{dx}\right) = \frac{x}{\left(\frac{dy}{dx}\right)+\left(\frac{dy}{dx}\right)^3}$$

45) A differential equation, determine its order, degree (if exists)

$$x^2\frac{d^2y}{dx^2} + \left[1 + \left(\frac{dy}{dx}\right)^2\right]^{\frac{1}{2}} = 0$$

46) A differential equation, determine its order, degree (if exists)

$$\frac{d^2y}{dx^2} + 5\frac{dy}{dx} + \int ydx = x^3$$

47) Determine the order and degree (if exists) of the following differential equations:

$$\frac{d^2y}{dx^2} + 3\left(\frac{dy}{dx}\right)^2 = x^2 log\left(\frac{d^2y}{dx^2}\right)$$

48) An urn contains 5 mangoes and 4 apples Three fruits are taken at randaom If the number of apples taken is a random variable, then find the values of the random variable and number of points in its inverse images.

49) Three fair coins are tossed simultaneously. Find the probability mass function for number of heads occurred

50) Compute P(X = k)for the binomial distribution, B(n,p) where

n=9,$p = \frac{1}{2}$,k=7

51) Determine whether $*$ is a binary operation on the sets given below.
a*b=b=a.|b| on R

52) Let *be defined on R by (a*b)=a+b+ab-7. is*binary on R? If so, find $3\left(\frac{-7}{15}\right)$.

53) Fill in the following table so that the binary operation $*$ on A = {a,b,c} is commutative.

*	a	b	c
a	b		
b	c	b	a
c	a		c

54) Construct the truth table for the following statements.
¬p ∧ ¬q

55) Construct the truth table for the following statements.
(p V q) ∧ ¬q