

CLASS XII GUESS PAPER MATHS

SECTION A (1 mark question)

- 1) Find the principal value of $\cot^{-1}\left(\frac{-1}{\sqrt{3}}\right)$
- 2) Evaluate $\sin\left(\cos^{-1}\left(\frac{1}{2}\right)\right)$
- 3) If $f(x)=\sin(7x^0)$ find $\frac{dy}{dx}$
- 4) If the points $(3,-2)$, $(x,2)$ and $(8,8)$ are collinear find 'x' using determinants

SECTION B (2 marks questions)

- 5) If A is a square matrix of order 3 such that $|\text{adj}A|=64$. Find $|A|$
- 6) Find the area of the parallelogram determined by the vectors $\hat{i} + 2\hat{j} + 3\hat{k}$ and $3\hat{i} - 2\hat{j} + \hat{k}$
- 7) Find x,y,z and a for which $\begin{pmatrix} x+3 & 2y+x \\ z-1 & 4a-6 \end{pmatrix} = \begin{pmatrix} 0 & -1 \\ 3 & 2a \end{pmatrix}$
- 8) Find the distance between the points A(2,3,1) and B(-1,2,-3) using the vector method .
- 9) Find the value of p if the angle between the pair of lines $\frac{x+3}{3} = \frac{y-1}{5p} = \frac{z+5}{4}$ and $x+1 = y+4 = \frac{5-z}{-2}$ is 90°
- 10) Write the integrating factor of the differential equation $\frac{dy}{dx} + y = \frac{1+y}{x}$
- 11) Evaluate $\int \frac{\tan^4 \sqrt{x} \sec^2 \sqrt{x}}{\sqrt{x}} dx$
- 12) form a differential equation for the following curve $x+y=\tan^{-1}y$

SECTION B(4 marks questions)

13) A man is known to speak the truth 3 out of 4 times. He throws a pair of dice and reports that the sum is a six. Find the probability that actually the sum is a six.

14) Find the equation of the plane that contains the point (1,-1,2) and is perpendicular to each of the planes $2x+3y-2z=5$ and $x+2y-3z=8$.

(OR)

Find the shortest distance between the lines $\vec{r} = \hat{i} + 2\hat{j} - 4\hat{k} + \lambda(2\hat{i} + 3\hat{j} + 6\hat{k})$ and $\vec{r} = 3\hat{i} + 3\hat{j} - 5\hat{k} + \mu(2\hat{i} + 3\hat{j} + 6\hat{k})$

15) The scalar product of a vector with the vectors $\hat{i} + \hat{j} - 3\hat{k}$, $\hat{i} + 3\hat{j} - 2\hat{k}$, and $2\hat{i} + \hat{j} + 4\hat{k}$ are 0, 5 and 8 respectively. Find the vector (OR)

Find the equation of the plane through the points A (1, 1, 0), B (1, 2, 1) and C (-2, 2, -1) and hence

find the distance between the plane and the line $\frac{x-6}{3} = \frac{y-3}{-1} = \frac{z+2}{1}$

16) Evaluate $\int \frac{x^4}{(x-1)(x^2-1)} dx$ (OR) Evaluate $\int \frac{dx}{\cos(x+a)\cos(x+b)}$

17) Evaluate : $\int_0^{\frac{\pi}{2}} \frac{\sin^2 x}{\sin x + \cos x} dx$

18) Differentiate $\tan^{-1}\left(\frac{\sqrt{1+x^2}+1}{x}\right)$ with respect to $\cos^{-1}\sqrt{\frac{1+x^2}{2}}$

19) If $f(x) = \frac{\sqrt{2}\cos x - 1}{\cot x - 1}$, $x \neq \frac{\pi}{4}$ find the value of $f\left(\frac{\pi}{4}\right)$ so that $f(x)$ becomes continuous.

20) If $x = a(\theta + \sin\theta)$, $y = a(1 - \cos\theta)$, find $\frac{d^2y}{dx^2}$ at $\theta = \frac{\pi}{2}$

21) Prove that $\tan^{-1}\left(\frac{1}{x+y}\right) + \tan^{-1}\left(\frac{y}{x^2+xy+1}\right) = \cot^{-1} x$

(OR)

Prove that $\cos^{-1}\left(\sqrt{\frac{\sqrt{1+x^2}+1}{2\sqrt{1+x^2}}}\right) = \frac{1}{2}\tan^{-1} x$

22) Using the properties of determinants show that

$$\begin{vmatrix} c^2b^2 & bc & b+c \\ c^2a^2 & ca & c+a \\ a^2b^2 & ab & a+b \end{vmatrix} = 0$$

23) Consider $f: \mathbb{R} - \{-1\} \rightarrow \mathbb{R}$ be a function defined by $f(x) = \frac{x}{x+1}$. Prove that 'f' is bijective. Hence find f^{-1} .

SECTION C (6 marks questions)

24) An open tank with a square base and vertical sides is to be constructed from a metal sheet hold a given quantity of water . Show that the cost of the material will be the least when the depth of the tank is half of its width .

25) Find the area of the region: $\{(x, y) : 0 \leq y \leq x^2; 0 \leq y \leq x + 2; 0 \leq x \leq 3\}$

26) Find the particular solution of the differential equation

$$\left[x \sin^2 \frac{y}{x} - y \right] dx + x dy = 0; y = \frac{\pi}{4} \text{ when } x = 1$$

(OR)

Form the differential equation representing the family of circles $y^2 = 2c(x + \sqrt{c})$, where 'c' is a positive parameter. Also find the order and the degree of the differential equation.

27) Two schools A and B want to award their selected teachers on the values of honesty, hard work and regularity. The school A wants to award Rs. x each, Rs. Y each and Rs. z each for the three respective values to 3, 2 and 1 teachers with total award money of Rs. 1.28 lakhs. School B wants to spend Rs. 1.54 lakhs to award its 4, 1 and 3 teachers on the respective values (by giving the same award money for the three values as before). If the total amount of award for one prize on each value is Rs. 57000, using matrices, find the award money for each value.

28) Suppose a girl throws a die. If she gets a 5 or 6, she tosses a coin three times and notes the number of heads. If she gets 1,2,3,4 she tosses a coin once and notes whether a head or tail is obtained .if she obtained exactly one head, what is the probability that she threw 1, 2, 3, or 4 with the die.

29) A dietician has to prepare a special diet using two foods P and Q. Each packet (containing 30 g) of food P contains 12 units of calcium, 4 units of iron, 6 units of cholesterol and 6 units of vitamin A. While each packet of the same food Q contains 3 units of calcium, 20 units of iron, 4 units of cholesterol and 3 units of vitamin A. The diet requires at least 240 units of calcium, at least 460 units of iron and at most 300 units of cholesterol. How many packets of each food should be used to maximize the amount of vitamin A in the diet? What is the maximum amount of vitamin A?