

# CLASS XII GUESS PAPER MATHS

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**Q.1** Write the number of all one – one function from the set A with Cartesian number 4 to itself.

**Q.2** Write the value of  $\tan\left(\sin^{-1} \frac{3}{5} + \cot^{-1} \frac{3}{2}\right)$

**Q.3** For what values of a,  $\begin{pmatrix} 2a & -1 \\ -8 & 3 \end{pmatrix}$  is a non singular matrix?

**Q.4** Find the value of x, if  $\begin{pmatrix} 5 & 3x \\ 2y & z \end{pmatrix} = \begin{pmatrix} 5 & 4 \\ 12 & 6 \end{pmatrix}^T$

**Q.5** If A is a square matrix of 3 x 3 order and  $|A| = 5$ , find the value of  $|A \text{ adj}A|$

**Q.6** Evaluate:  $\int \frac{\cos 2x}{(\sin x + \cos x)^2} dx$

### SECTION – B

**Q.7** Prove that :  $\tan^{-1} \frac{1}{5} + \tan^{-1} \frac{1}{7} + \tan^{-1} \frac{1}{3} + \tan^{-1} \frac{1}{8} = \frac{\pi}{4}$

**OR**

$$\tan^{-1} 4x = \cot^{-1} \left\{ 2 \tan \left( \cos^{-1} \frac{5}{13} \right) \right\} + \tan^{-1} \left\{ 2 \tan \left( \sin^{-1} \frac{5}{13} \right) \right\}$$

Solve the equation:

**Q.8** Consider the binary operation  $*$  :  $R \times R \rightarrow R$  and  $\circ$  :  $R \times R \rightarrow R$  defined  $a * b = |a - b|$  and  $\circ b = a$  for all a, b  $\in R$ . Show that  $*$  is commutative but not associative,  $\circ$  is associative

but not commutative. Further, show that for all  $a, b, c \in \mathbb{R}$ ,  $a * (b \circ c) = (a * b) \circ (a * c)$ .

Does  $\circ$  distributes over  $*$ ? Justify your answer.

**Q.9** Prove that 
$$\begin{vmatrix} a^2 + 1 & ab & ac \\ ab & b^2 + 1 & bc \\ ca & cb & c^2 + 1 \end{vmatrix} = 1 + a^2 + b^2 + c^2$$

**Q10** Prove that  $f(x) = |x-1| + |x-2|$  is continuous but not differentiable at  $x = 2$ .

**OR**

Differentiate  $(x \cos x)^x + (x \sin x)^{\frac{1}{x}}$

**Q.11** Find the interval in which the function  $f(x) = \frac{3}{10}x^4 - \frac{4}{5}x^3 - 3x^2 + \frac{36}{5}x + 11$  is strictly increasing or strictly decreasing.

**OR**

A water tank has the shape of an inverted right cone with its axis vertical and vertex lowermost. Its semi-vertical angle is  $\tan^{-1}(0.5)$ . Water is poured into it at a constant rate of 5 cubic metre per hour. Find the rate at which the level of the water is rising at the instant when the depth of water in tank is 4 m,

**Q12** Integrate 
$$\int \frac{dx}{(\sin x - 2 \cos x)(2 \sin x + \cos x)}$$

**OR**

Integrate 
$$\int \frac{1}{\sec x + \sin x} dx$$

**Q13** If  $x = \frac{1 + \log t}{t^2}$ ,  $y = \frac{3 + 2 \log t}{t}$ ,  $t > 0$  prove that  $yy_1 - 2xy_1^2 = 1$

**SECTION – C**

**Q14** Given that  $A = \begin{bmatrix} 1 & 1 & 2 \\ -1 & -2 & 1 \\ 1 & -2 & 3 \end{bmatrix}$  find  $A^{-1}$ . Hence using  $A^{-1}$  solve the system of equations:

$$x - y + z = 4, \quad x - 2y - 2z = 9, \quad 2x + y + 3z = 1$$

**OR**

Using elementary transformation find the inverse of matrix:  $\begin{bmatrix} 1 & -1 & 2 \\ 0 & 2 & -3 \\ 3 & -2 & 4 \end{bmatrix}$

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