

ISC Class 12 Maths Important Questions

- 1. A binary operation * defined on Q-{1} is given by a * b = a+b ab. Find the identity element.
- 2. A family has two children. What is the probability that both children are boys, given that at least one of them is a boy?
- 3. Let R+ be the set of all positive real numbers and f: R+ $[4, \infty)$: $f(x) = x^2 + 4$. Show that inverse of f exists and find f^{-1} .
- 4. A circular disc of radius 3 cm. is heated. Due to expansion its radius increases at the rate of 0.05 cm/s. Find the rate at which its area increases when the radius is 3.2 cm.
- 5. An open topped box is to be made by removing equal squares from each corner of a 3 m by 8 m rectangle sheet of aluminium and by folding up the sides. Find the volume of the largest such box.
- 6. A, B and C throw a die one after the other in the same order till one of them gets a '6' and wins the game. Find their respective probability of winning, if A starts the game.
- 7. Find the cost of increasing from 100 to 200 units if the marginal cost in Rupees per unit is given by the function MC = 0.003 x2-0.01 x+2.5.
- 8. If two lines of regression are 4x + 2y 3=0 and 3x + 6y + 5 = 0, find the correlation coefficient between x and y.
- 9. Given that the observations are (9,-4), (10, -3), (11,-1), (13,1), (14,3), (15,5), (16,8), find the two lines of regression. Estimate the value of y when x = 13.5.
- 10. Find the regression coefficient b_{yx} and b_{xy} and the two lines of regression for the following data.

Х	2	6	4	7	5
Y	8	8	5	6	2

Also, compute the correlation coefficient.

- 11. A toy company manufactures two types of dolls A and B. Market test and available resources have indicated that the combined production level should not exceed 1200 dolls per week and the demands for the dolls of type B is atmost half of that for dolls of type A. Further, the production level of type A can exceed three times the production of dolls of other type by at most 600 units. If the company makes profit of Rs12 and Rs16 per doll respectively on dolls A and B, how many of each type of dolls should be produced weekly, in order to maximize the profit?
- 12. Find

 $\frac{dy}{dx}$, if $x = at^2$ and y = 2at.

- 13. Find the differential equation of the family of curves $y = Ae^x + Be^{-x}$, where A and B are arbitrary constants.
- 14. Find the intervals in which the function f(x) is strictly increasing where, $f(x) = 10 - 6x - 2x^2$
- 15. Prove that the function f(x) = |x-1|, $x \in \mathbb{R}$ is continuous at x = 1 but not differentiable.
- 16. Evaluate:

$$\int \frac{6x+7}{\sqrt{(x-5)(x-4)}} dx$$

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17. Prove that:

$$\tan^{-1}\frac{1}{2} = \frac{\pi}{4} - \frac{1}{2}\cos^{-1}\left(\frac{4}{5}\right).$$

18. Verify Rolle's Theorem for the following function:

$$f(x) = e^x sinx \ \forall \ x \epsilon \ [0, \pi]$$

19. Solve the following differential equation:

$$x\frac{dy}{dx} + 2y = x^2 logx$$

20. Let X denote the number of hours you study during a randomly selected school day. The probability that X can take the values 'x' has the following form, where 'k' is some unknown constant.

$$P(X=x) = \begin{cases} 0.1, & if \ x = 0 \\ kx, & if \ x = 1 \ or \ 2 \\ k(5-x), & if \ x = 3 \ or \ 4 \\ 0, & otherwise \end{cases}$$

- a. Find the value of 'k'.
- b. What is the probability that you study:
 - i. at least two hours?
 - ii. exactly two hours?
 - iii. at most 2 hours?