# Rajasthan Board Class 12 Maths Important Questions

1) If the points (x,-2), (5, 2), (8, 8) are colinear, then find the value of x.

2) Find the unit vector along the sum of vectors $\bar{a} = 2\hat{i} + 2\hat{j} - 5\hat{k}$ and $\bar{b} = 2\hat{i} + \hat{j} + 3\hat{k}$.

3) If 2P (A) =P (B) =5/13 and P (A/B) = ⅖ then find P (A ∪ B)

4) If f: R → R, f(x) = $x_2$ – 5x + 7, then find the value of f ⁻¹(1).

5) Find A, if 2A - $\begin{bmatrix} 3 & -1 \\ 1 & 2 \\ 0 & 5 \end{bmatrix} = \begin{bmatrix} 1 & 5 \\ 3 & 2 \\ 0 & 1 \end{bmatrix}$

6) Find the direction cosines of the line (x-2) /2 = (y+1) / -2 = (z-1) /1.

7) Find $\int \frac{\tan x}{\cot x} dx$.

8) Find the angle between planes $\vec{r}.(\hat{i} - \hat{j} + \hat{k})$ and $\vec{r}.(2\hat{i} - \hat{j} - \hat{k})$.

9) From a pack of 52 cards, two cards are drawn randomly one by one without replacement. Find the probability that both of them are red.

10) Show the region of feasible solution under the following constraints xy+≥28x, ≥0y, ≥0 in the answer book.

11) Examine continuity at x= 1 of function f (x) = f | x -1 |

12) Find $\int \frac{1}{1+\sin x} dx$

13) If $A = \begin{bmatrix} 1 & -2 \\ 2 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} -5 & -2 \\ 1 & 2 \end{bmatrix}$ then find 2A²-3B.

$$f(x)=\begin{cases} \dfrac{e^{1/x}}{1+e^{1/x}} : & x\neq 0 \\ 0 : & x=0 \end{cases} \quad \text{at } x = 0.$$

14) Examine the continuity of the function f defined by

15) Prove that the relation R in set of real numbers R defined as R {(, ab): a=≥b} is reflexive and transitive but not symmetric.

16) Solve $2\tan^{-1}(\sin x) = \tan^{-1}(2\sec x)$, $0 < x < \pi/2$.

17) Find the intervals in which the function f given by $f(x) = x^2 - 6x+5$ is
a)      Strictly increasing
b)      Strictly decreasing

18) Prove that the relation R defined on set Z as a R b $\Leftrightarrow$ a − b is divisible by 3, is an equivalence relation.

19) Prove that $\tan^{-1}\left[\dfrac{\sqrt{1+x}+\sqrt{1-x}}{\sqrt{1+x}-\sqrt{1-x}}\right] = \dfrac{\pi}{4} + \dfrac{1}{2}\cos^{-1}x, 0 < x < 1.$

20) If the radius of a sphere is measured as 9 cm with an error of 0·02 cm, then find the approximate error in calculating its volume.

21) Find two positive numbers x and y, sum of them is 60 and $xy^3$ is maximum.

22) Solve the equation $\cos^{-1}x + \cos^{-1}2x = (2\pi)/3$

23) Solve the following system of equations by using Cramer's rule.
      5x − 4y = 7
      x + 3y = 9

24) Using integration find the area of a triangular region whose sides have the equations y = x +   1, y = 2x + 1 and x = 2.
(Draw the figure in answer book)

25) Find the area of the triangle whose vertices are A (1, 1, 1), B (1, 2, 3) and C (2, 3, 3).

26)  Prove that $\dfrac{d^2 y}{dx^2} = \dfrac{2y}{x^2}$ .

27)  A man is known to speak the truth 3 out of 4 times. He throws a dice and reports that it is 6. Find the probability that it is actually 6.

28) Bag A contains 2 red and 3 black balls while another bag B contains 3 red and 4 black balls. One ball is drawn at random from one of the bags and it is found to be red. Find the probability that it was drawn from bag B.

29) Prove that if a plane has the intercepts a, b, c and is at a distance p units from the origin, then prove that $(1/a^2) + (1/b^2 + (1/c^2) = (1/p^2)$.

30) A dice is thrown twice and the sum of the numbers appearing is observed to be 7. Find the conditional probability that the number 3 has appeared at least once.

31) Find the equation of the plane through the line of intersection of the 1+y + z = and 2x + 3y + 4z = 5 which is perpendicular to the  x- y + z =3.