



## Mathematics

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- (a)  $A = \{-2, 0, 3, 4, 5\}$ ,  $B = \{1, 2, 3, 4, 5\}$ ,  $C = \{3, 4, 9, 15, 17\}$  then  $A \cap B \cap C =$

(b) If  $x^{\frac{2}{3}} - 7x^{\frac{1}{3}} + 10 = 0$ , then  $x =$

(c) If  $x^2 + y^2 = 25$ ,  $xy = 12$ , then  $x =$
- (a) Number of diagonals of a polygon of  $n$  sides =

(b) The greatest coefficient in the expansion of  $(1 + x)^{2n+2}$  is
- (a) A tree is broken by wind, its upper part touches the ground at a point 10 metres from the foot of the tree and makes an angle of  $45^\circ$  with the ground. The entire length of the tree is

(b) If the angles of a triangle are to one another as 1:2:3, then its corresponding sides are as
- (a) The straight line  $x + y = a$  will be tangent to the ellipse  $\frac{x^2}{9} + \frac{y^2}{16} = 1$  if  $a =$

(b) The equation of a circle with origin as centre passing through the vertices of an equilateral triangle whose median is of length  $3a$  is
- (a)  $\lim_{x \rightarrow \infty} \frac{\sqrt{x^2-1}}{2x+1} =$

(b) The domain of the function  $f(x) = \sqrt{2 - 2x - x^2}$  is

(c) if  $\left(1 + \frac{1}{x}\right)^x$  then  $\frac{dy}{dx} =$
- (a)  $\int \log x \, dx =$

(b)  $\int_0^{\pi/2} \frac{dx}{2 + \cos x} =$
- (a) Two like parallel forces  $P$  and  $Q$  act on a rigid body at  $A$  and  $B$  respectively. If  $P$  and  $Q$  be interchanged in position, show that point of application of the resultant is displaced through a distance  $d$  along  $AB$  where  $d =$

(b) The least force required to pull a body of weight  $w$  up an inclined rough plane is  $\alpha$  is the inclination of the plane and  $\lambda$  is the angle of friction.
- (a) The distance between Delhi and Agra is 200 km and a bus covers it in 5 hours. Every hour a bus starts from Delhi to Agra and also from Agra to Delhi. If a bus starting from Delhi meets  $x$  number of buses coming from Agra, then  $x =$

(b) A ball is thrown at an angle  $\alpha$  to the horizon. If it passes through the edges of two walls of height 10 metres at distances 10 metres and 20 metres from the point of projection, then  $\alpha =$
- (a) The position vectors of two points  $A$  and  $B$  are  $\vec{i} + 2\vec{j} + \vec{k}$  and  $2\vec{i} - \vec{j} + \vec{k}$  respectively then  $|\overline{AB}| =$

(b) The moment of a force represented by  $\vec{F} = \vec{i} + 2\vec{j} + \vec{k}$  about the point  $B =$



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( c ) If the force given as  $\vec{F} = \vec{i} + 2\vec{j} + \vec{k}$  moves from A to B give in Qr. 9( a ) then work done will be represented by

10. ( a ) The standard deviation of 6,7,8,9,10 is

( b ) The probabilities of solving a problem by three students A, B, C are  $1/2, 1/3, 1/4$  respectively. The probability of that the problem will be solved is