



MATHS

BOOKS - ARIHANT PUBLICATION

QUESTION PAPER 2018

Very Short Answer Type Questions Answer All The Questions

1. If p and q are respectively degree and order of the differential equation $y = e^{dy/dx}$, then write the relation between p and q.



2. If
$$\left(\overrightarrow{a}\times\overrightarrow{b}
ight)^2+\left(\overrightarrow{a}\cdot\overrightarrow{b}
ight)^2=144$$
, write the

value of ab.

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4. Sets A and B have respectively m and n elements. The total number of relations from A to B is 64. If m < n and $m \neq 1$, write the values of m and n respectively.





6. If every element of a third order determinant of value 8 is multiplied by 2, then write the value of the new determinant.



7. In a Davis Cup tie between India and South Korea, write the probability that India is ahead 2-1 after 3 matches assuming that both the teams are equally likely to win each match.



8. Write the interval in which the function $f(x) = \sin^{-1}(2 - x)$ is differentiable. Watch Video Solution

9. A balloon is pumped at the rate of 2 cm^3 / minute. Write the rate of increase of the surface area, when the radius is 0.5 cm.



10. Write the definite integral which is equal to

$$\lim_{n o\infty}\;rac{1}{n}\sum_{r=1}^nrac{r}{\sqrt{n^2+r^2}}$$

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Short Answer Type Questions Answer Any Three Questions

1. Prove the
$$\sin^{-1}\sqrt{rac{x-q}{p-q}}=\cos^{-1}$$
sqrt((p-x)/(p-

2. Sole the following LPP graphically

Minimize Z = 4x + 3y

subject to $2x + 5y \ge 10$ and $x, y \ge 0$.



3. Let ~ be defined by (m,n)~(p,q) if mq=np where m, n, p, $q \in Z$ -{0}. Show that it is an equivalence relation.

4. Let
$$f(x) = \sqrt{x}$$
 and $g(x) = 1 - x^2$. Compute

fog and gof and find their natural domains.



6. A bag A contains 2 white and 3 red balls and another bag B contains 4 white and 5 red balls. One ball is drawn at random from a bag chosen at random and it is found to be red. Find the

probability that it was drawn from bag B.

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7. If
$$P(A)=0.6, \ Pigg(rac{B}{A}igg)=0.5, \ {
m find} \ P(A\cup B)$$

when A and B are independent.

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8. If A,B,C are matrices of order 2×2 each and $2A + B + C = \begin{bmatrix} 1 & 2 \\ 3 & 0 \end{bmatrix}$



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11. Show that the sum of the intercepts on the coordinate axes of any tangent to the curve $\sqrt{x} + \sqrt{y} = \sqrt{a}$ is constant.

12. Show that 2sinx+tanx
$$\geq$$
 3x for all x $arepsilon \left(0, rac{\pi}{2}
ight)$.



14. Differentiate $y = \left(\sin y\right)^{\sin 2x}$

15. Test the continuity of the following function at



x = 0

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16. From the differential equation whose general

solution is $y = a \sin t + b e^t$.



17. Solve the following differential equations

$$ig(1+y^2ig)dx+\Big(x-e^{- an^{-1}y}\Big)dy=0$$



18. Evaluate
$$\int \! \frac{dx}{(x+1)\sqrt{1-x^2}}$$

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19.
$$\int_{0}^{rac{1}{2}} rac{1}{\sqrt{1-x^{2}}} dx.$$

20. Find the area enclosed bt the two paraboles

$$y^2=4$$
 ax and $x^2=4$ ay.

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21. Prove that the measure of the angle between two main diagonals of a cube is $\cos^{-1}\frac{1}{3}$.



22. The position vectors of two points A and B are $3\hat{i} + \hat{j} + 2\hat{k}$ and $\hat{i} - 2\hat{j} - 4\hat{k}$, respectively. Find the equation of the plane passing through B and prependicular to AB.

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23. Find the area of the triangle ABC with vertices

A(1,2,4), B(3,1,-2) and C(4,3,1) by vector method.





26.



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27. Find the shortest distance between the lines

$$\frac{x-3}{3} = \frac{y-8}{-1} = \frac{z-3}{1}$$
 and
$$\frac{x+3}{-3} = \frac{y-7}{2} = \frac{z-6}{4}$$
 Find also the

equation of the line of shortest distance.

28.
$$\int_0^1 \frac{1}{1-x^2} dx.$$

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29. Let $f: X \to Y$ and $g: Y \to Z$. Prove that gof is bijective if both f and g are bijective. Also prove that $(gof)^{-1} = f^{-1}og^{-1}$.

30. In a $\triangle ABC$, if $m \angle A = 90^{\circ}$, prove that $\tan^{-1} \frac{b}{a+c} + \tan^{-1} \frac{c}{a+b} = \frac{\pi}{4}$, where a,b, c are sides of the triangle.

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31. By elementary operations, find A^{-1} for the

following:
$$A = egin{bmatrix} 1 & 1 & 0 \ 1 & -1 & 1 \ 1 & -1 & 2 \end{bmatrix}$$

32. Solve the following system of equations by the

matrix inversion method.

x + y + z = 4

2x - y + 3z = 1

and 3x + 2y - z = 1

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33. Two cards are drawn successively with replacement from a well-shuffled deck of 52 cards. Find the probability distribution of the number of

aces.



34. Find the coordinates of the point on the curve

$$x^2y - x + y = 0$$

where the slope of the tangent is maximum.



36. Find the solution of the following differential

equations:

(4x+6y+5)dx-(2x+3y+4)dy=0

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37. Evaluate
$$\int \frac{2\cos x + 7}{4 - \sin x} dx$$

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38. Find the area enclosed by y = 4x - 1 and

$$y^2 = 2x.$$



