



www.zigya.com

Previous Year Paper

Mathematics - 2013

Study, Assignments, Solved Previous Year Papers . Questions and Answers. Free Forever.



Short Answer Type

1. If $(A - 2I)(A - 3I) = 0$, where $A = 42 - 1x$ and $I = 1001$, find the value of x .

[Answer](#)

2. Find the values of k so that the line $2x + y + k = 0$ may touch the hyperbola $3x^2 - y^2 = 3$

[Answer](#)

3. Prove that: $\tan^{-1}14 + \tan^{-1}29 = 12\sin^{-1}45$

[Answer](#)

4. Using L'Hospital's Rule, evaluate:

$$\lim_{x \rightarrow 0} \frac{e^x - e^{-x} - 2x - \sin x}{x^3}$$

[Answer](#)

5. Evaluate: $\int \frac{1}{x} + x dx$

[Answer](#)

6. Evaluate: $\int_0^1 \log 1x - 1 dx$

[Answer](#)

7. Two regression lines are represented by $4x + 10y = 9$ and $6x + 3y = 4$. Find the line of regression of y on x .

[Answer](#)

8. If $1, w$, and w^2 are the cube roots of unity, evaluate $(1 - w^4 + w^8)(1 - w^8 + w^{16})$

[Answer](#)

9. Solve the differential equation:

$$\log y dx = 2x - 3y$$

[Answer](#)

10. If two balls are drawn from a bag containing three red balls and four blue balls, find the probability that:

- (a) They are of the same colour
- (b) They are of different colours

[Answer](#)

11. Using properties of determinants, prove that:

$$xyz + 2y^2z + 2yz^2 + 2xy^2 + 2x^2y + 2xz^2 + 2x^2z + 2y^2x + 2yzx + 2xzy = (x - y)(y - z)(z - x)(x + y + z)$$

[Answer](#)

12. Solve for x : $\sin^{-1}x + \sin^{-1}x = \cos^{-1}x$
Like. Share. Bookmark. Download. Make Notes. Print - Your Favourite Questions. Join www.zigya.com

13. Construct a circuit diagram for the following Boolean Function:

$$(BC + A)(AB + C) + A'BC$$

Using laws of Boolean Algebra, simplify the function and draw the simplified circuit.

Answer

14. Verify Lagrange's Mean value theorem for the function $f(x) = x^2 - x$ in the interval $[1, 4]$.

Answer

15. From the following information, find the equation of the Hyperbola and the equation of its Transverse Axis:

Focus: $(-2, 1)$, Directrix: $2x - 3y + 1 = 0$, $e = 23$

Answer

16. If $y = \cot^{-1}x^2$, show that $1 + x^2 \frac{d^2y}{dx^2} + 2x(1 + x^2) \frac{dy}{dx} = 2$

Answer

17. Find the maximum value of the cylinder which can be inscribed in a sphere of radius 33 cm. (Leave the answer in terms of π)

Answer

18. Evaluate: $\int \cos^{-1} x x^2 dx$

Answer

19. Find the area bounded by the curve $y = 2x - x^2$, and the line $y = x$

Answer

20. Find the Karl Pearson's co-efficient of correlation between x and y for the following data:

x	16	18	21	20	22	26	27	15
y	22	25	24	26	25	30	33	14

Answer

21. The following table shows the mean and standard deviation of the marks of Mathematics and Physics scored by the students in a school:

	Mathematics	Physics
Mean	84	81
Standard Deviation	7	4

The correlation coefficient between the given marks is 0.86. Estimate the likely marks in physics if the marks in Mathematics are 92.

Answer

22. Big, Short, Book, made, Download, Make, Notes, Print, bag, Br, Fountain, Questions, and, new, write, calls. If

one ball is drawn from bag A and two balls from bag b, find the probability that

(i) One ball is red and two balls are white.

(ii) All the three balls are of the same colour.

Answer

23. Three persons Aman, Bipin and Mohan attempt a mathematics problem independently. The odds in favour of Aman and Mohan solving the problem are 3:2 and 4:1 respectively and the odds against Bipin solving the problem are 2:1. Find:

(i) The probability that all the three will solve the problem.

(ii) The probability that problem will be solved.

Answer

24. If the sum and the product of the mean and variance of a Binomial Distribution are 1.8 and 0.8 respectively, find the probability distribution the probability of at least one success.

Answer

25. The price index for the following data for the year 2011 taking 2001 as the base year was 127. The simple average price relatives method was used. Find the value of x:

Items	A	B	C	D	E	F
Price (Rs. per unit) in 2001	80	70	50	20	18	25
Price (Rs. per unit) in 2011	100	87.50	61	22	X	32.50

Answer

26. The profits of a paper bag manufacturing company (in laks of rupees) during each month of a year are :

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	NOV	Dec
Profit	1.2	0.8	1.4	1.6	2.0	2.4	3.6	4.8	3.4	1.8	0.8	1.2

Plot the given data on a graph sheet. Calculate the four monthly moving averages and plot these on the same graph sheet.

Answer



Long Answer Type

27. Find A^{-1} , where $A = 42311131-2$

Hence, solve the following system of linear equations:

Like. Share. Bookmark. Download. Make Notes. Print - Your Favourite Questions. Join www.zigya.com

$$x + y + z = 1$$

$$3x + y - 2z = 5$$

Study Assignments, Solved Previous Year Papers . Questions and Answers. Free Forever.

Answer

28. Find the locus of the complex number $z = x + iy$, satisfying relations $(z - 1) = \pi 4$, and $z - 2 - 3i = 2$. Illustrate the locus on the Argand plane.

Answer

29. Solve the following differential equation:

$$ye^y dx = (y^3 + 2xe^y) dy, \text{ given that } x = 0, y = 1.$$

Answer

30. Find the value of λ for which the four points A, B, C, D with position vectors $\hat{i} - \hat{j} - \hat{k}$; $4\hat{i} + 5\hat{j} + \lambda\hat{k}$; $3\hat{i} + 9\hat{j} + 4\hat{k}$ and $-4\hat{i} + 4\hat{j} + 4\hat{k}$ are coplanar.

Answer

31. If $\vec{a}$ and $\vec{b}$ are unit vectors and θ is the angle between them, then show that $\vec{a} \times \vec{b} = 2\sin(\theta/2)$

Answer

32. Find the equation of line passing through the point $(-1, 3, -2)$ and perpendicular to the lines: $x_1 = y_2 = z_3$ and $x + 2 - 3 = y - 12 = z + 15$

Answer

33. Find the equations of planes parallel to the plane $2x - 4y + 4z = 7$ and which are at a distance of five units from the point $(3, -1, 2)$

Answer

34. For A, B and C, the chances of being selected as manager of a firm are $4 : 1 : 2$, respectively. The probabilities for them to introduce a radical change in the marketing strategy are 0.3, 0.8 and 0.5 respectively. If a change takes place; find the probability that it is due to the appointment of B.

Answer

35. Mr. Nirav deposits Rs.250 at the beginning of each month in an account that pays an interest of 6 % per annum compounded monthly, how many months will be required for the deposit to amount to at least Rs. 6390?

Answer

36. A mill owner buys two types of machines A and B for his mill. Machine A occupies 1000sqm of area and requires 12 men to operate it; while machine B occupies 1200sqm of area and requires 8 men to operate it. The owner has 7600 sqm of area available and 72 men to operate the machines. If machine A produces 50 units B produces 40 units daily, how many machines of each type should he buy to maximise the daily output? Use Linear Programming to find the solutions.

Answer

37. A bill of Rs. 60,000 was drawn on 1st April 2011 at 4 months and discounted for Rs. 58560 at a

Like. Share. Bookmark. Download. Make Notes. Print Your Favourite Questions. Join www.zigya.com

[Answer](#)[Study Assignments Solved Previous Year Papers Questions and Answers Free Forever](#)

38. A company produces a commodity with Rs. 24,000 fixed cost. The variable cost is estimated to be 25 % of the total revenue recovered on selling the product at a rate of Rs. 8 per unit. Find the following:
- (i) Cost function
 - (ii) Revenue function
 - (iii) Breakeven point

[Answer](#)