MATHS

BOOKS - JMD MATHS (PUNJABI ENGLISH)

SOLVED SAMPLE QUESTION PAPERS

Example

1. The range of function $f(x) = \frac{|x-1|}{x-1}$

A. 1

B. $R - \{0\}$

C. -1

D. [-1,1]

Answer: D

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2. The value of $\cos\left(\tan^{-1}\left(\frac{3}{4}\right)\right)$ is:

A. $\frac{4}{3}$

B. $\frac{4}{5}$

C. $\frac{3}{4}$

D. None of these

Answer: A

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3. If $A + B = C$, where A and B are matrices of order 2×3, then order of C is :

A. 3*2

B. 2*3

C. 2*2

D. 3*3

Answer: B

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4. If $\begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix} = \begin{bmatrix} x & 3 \\ 2x & 5 \end{bmatrix}$, then x =

A. 3

B. 4

C. 2

D. None of these

Answer: C

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5. The derivative of $\sin x^2 w.\ r.\ t.$ x^2` is

A. $\cos x^2$

B. 2x cos x^2`

C. $\sin 2\frac{x}{2}x$

D. $\frac{\cos x^5}{2} x^2$

Answer: A

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6. If $f(x) = \begin{cases} 2x+3 & x \leq 1 \\ k & x > \end{cases}$ is continuous at $x = 1$ then k=

A. 2

B. 5

C. 3

D. 1

Answer: B

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7. $\frac{d}{dx}\left[\sin^{-1}(\cos x)\right]=$

A. $-\sin x$

B. -1

C. x

D. $\frac{\pi}{2}-x$

Answer: B

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8. The value of $\int \frac{\sec^2 x}{\cos ec^2 x} dx$ is

A. $\left(\frac{\tan x}{\cot x}\right)+c$

B. Sec^2 x/(cosec^2 x)+c

C. $\tan x - x + c$

D. None of these

Answer: C

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9. int e^(log x)/x dx`=

A. $\log x + c$

B. $e^{\log x} + c$

C. $x \log x + c$

D. $xe^{\log x} + c$

Answer: B

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10. The degree of the differential equation $\frac{d^2y}{dx^2} + \left[1 + \left(\frac{dy}{dx}\right)^2\right]^{\frac{3}{2}} = 0$ is

A. 1

B. 2

C. 3

D. None of these

Answer: B

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11. The angle between the vectors $\vec{a} = \hat{i} - 2\hat{j} + 3\hat{k}$and $\hat{b} = 3\hat{i} - 2\hat{j} - \hat{k}$ is :

A. cos^(-1) (2/7)`

B. $\cos^{-1}\left(\frac{5}{7}\right)$

C. cos^(-1) (6/7)`

D. None of these

Answer: A

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12. Find $\overrightarrow{|x|}$, if for a unit vector veca , (vecx-veca). (vecx+veca)=8`

A. 3

B. 9

C. 2

D. sqrt 3

Answer: A

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13. Distance of the point (2,5,-3) from the plane $\vec{r}.\left(6\hat{i}-3\hat{j}+2\hat{k}\right)=4$ is

A. 4

B. 44381

C. 44390

D. None of these

Answer: C

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14. The d.r. of line parallel to $x - \frac{3}{1} = y - \frac{4}{2} = 3 - \frac{x}{2}$ are

A. $< 1, 2, 2 >$

B. $< 1, -2, 2 >$

C. $< 1, 2, -2 >$

D. $< 1, -2, -2 >$

Answer: B

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15. Solution set of inequality $x \geq 0$ is

A. half plne on the left of Y-axis

B. half plane on the right of Y-axis excluding y-axis

C. half plane on the right of Y-axis including the points on Y-axis

D. None og these

Answer: C

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16. In a family, with two children, the probability of both children are girls is:

A. $\frac{1}{5}$

B. 1/4`

C. $\frac{1}{3}$

D. $\frac{1}{2}$

Answer: B

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17. The number of relations set from $[A = 1, 2, 3]$ to $B = [1, 3]$ is ..... .

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18. The possible order of a matrix having 4 elements are ..... .

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19. $\begin{bmatrix} \left(\log_a^b\right) & 1 \\ 1 & \log_b^a \end{bmatrix}$ =..... .

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20. $\frac{d}{dx}(\log_a x)$=..... .

Watch Video Solution

21. f(x) = cos x is strictly increasing in $(\pi, 2\pi)$

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22. $\int \tan^2 x dx$=.....

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23. The degree of diff. equation $\frac{d^3y}{dx^3} + \left(\frac{dx}{dy}\right) + e^2 = 0$ is

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24. If $P(E) = 0.6,\ P(F) = 0.3$ and $P(E \cap F) = 0.2$then $P\left(\frac{E}{F}\right)$=..... .

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25. State whether it is true or false:$\sin^{-1}(\sin x) = x,$ $x \in \left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

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26. State whether it is true or false:If $A = \begin{bmatrix} 3 & -4 \\ 1 & -1 \end{bmatrix}$ then $2A = \begin{bmatrix} 6 & -8 \\ 2 & -8 \end{bmatrix}$

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27. State whether it is true or false:

$$\frac{d}{dx}\left(\cos^{-1} x\right) = \frac{-1}{\sqrt{1-x^2}}$$

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28. State whether it is true or false:

$$\int \frac{a^x}{b^x} dx = \frac{a^x}{b^x(\log a - \log b)} + c$$

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29. State whether it is true or false:$y = ax$ is a solution of

$xy + y = 0$

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30. State whether it is true or false:If $\left|\vec{a}.\vec{b}\right| = \left|\vec{a} \times \vec{b}\right|$ then the angle between vec a and vec b is π/6

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31. State whether it is true or false:If a line makes angles alpha, beta, gamma which positive direction of axes then $\cos 2\alpha + \cos 2\beta + \cos 2\gamma = 1.$

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32. State whether it is true or false:If A and B are dependent events then $P \cap B = P(A).(B)$

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33. Show that the points $(a+5, a+4), (a-2, a+3)$ and (a, a) do not lie on a straight line for any value of a.

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34. If $f(x) = \begin{bmatrix} \cos x & -\sin x & 0 \\ \sin x & \cos x & 0 \\ 0 & 0 & 1 \end{bmatrix}$, show that $f(x).\, f(y) = f(x+y)$

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35. The slope of the curve $2y^2 - ax^2 = b$ at (1,-1) is -1 find a and b.

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36. integrate $\int \frac{\cos 2x - \cos 2\alpha}{\cos x - \cos \alpha} dx$

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37. solve 'int_0^(π/4)sqrt(1+sin2xdx)'

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38. find the area of the region bounded by 'y^2=4x' and x=2

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39. Find lambda so that the scalar projection of $\vec{a} = \lambda\hat{i} + \hat{j} + 4\hat{k}$ on $\vec{b} = 2\hat{i} + 6\hat{j} + 3\hat{k}$ is 4units

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40. Find unit vector in the direction of veca+vecb, where $\vec{a} = -\hat{i} + \hat{j} + \hat{k}$ and 'vecb=2hati+hatj-3hatk'

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41. Prove that :

$$\tan^{-1}\left[\frac{\sqrt{1+x^2}-\sqrt{1-x^2}}{\sqrt{1+x^2}+\sqrt{1-x^2}}\right] = \frac{\pi}{4} - \frac{1}{2}\cos^{-1}x^2$$

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42. If $x^y + y^x = (x+y)^{x+y}$, then prove that $\frac{dy}{dx} = \frac{(x+y)^{x+y}[1+\log(x+y)] - yx^{y-1} - y^x \log y}{x^y \log x + xy^{x-1} - (x+y)^{x+y}[1+\log(x+y)]}$

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43. If $y = \left[\log\left(x + \sqrt{x^2+1}\right)\right]^2$ then show that $\left(x^2+1\right)y_2 + xy_1 = 0$

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44. Evaluate $\int \frac{dx}{\sin x - \sin 2x}$

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45. Solve $\left(3xy + y^2\right)dx + \left(x^2 + xy\right)dy = 0, y(1) = 1$

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46. solve the differential equation: $\frac{dy}{dx} = \tan(x + y)$

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47. A car manufacturing factory has to plant s X and Y. Plan X manufacturers 70% of the cars plant Y manufactures 30%. 80% of the cars at plant X and 90% of the cars at plant Y are rated of standard quality. A car is chosen at random and is found to be of standard quality what is the probability that it comes from plant X

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48. Solve the following system of linear equations by matrix method: $x - y + z = 4, 2x + y - 3z = 0, x + y + z = 2$

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49. If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$ then verify $A^{-1}A = I$

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50. Find the shortest distance (S.D.) between the lines : $\vec{r} = \hat{i} + \hat{j} + \lambda\left(2\hat{i} - \hat{j} + \hat{k}\right)$ and $\vec{r} = 2\hat{i} + \hat{j} - \hat{k} + \mu\left(3\hat{i} - 5\hat{j} + 2\hat{k}\right)$.

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51. Find the equation of the perpendicular drawn from the point (2,4,-1) to the line $\frac{x+5}{1} = \frac{y+3}{4} = \frac{z-6}{-9}$

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52. Maximise $z = 20x + 15y$ subject to constraints $120x + 60y \leq 12000, x + y \leq 150$

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53. Maximise $z = x + y$ subject to $2x + y \leq 50$, $x + 2y = 40$

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54. The number of bijective functions from A to B if $n(A) = n(B) = 4$

A. 81

B. 64

C. 16

D. 24

Answer: d

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55. The value of $\sin\left(\cos^{-1}\left(\frac{3}{5}\right)\right)$ is:

A. 4/5'

B. $\frac{3}{5}$

C. $\frac{2}{5}$

D. None of these

Answer: a

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56. If $AB = A$ and BA=B, then B^2=

A. B

B. A

C. I

D. O

Answer: C

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57. If A is a square matrix of order 3 such that $|A| = 13$, then $|adjA|$ is equal to

A. 39

B. 196

C. 169

D. 190

Answer: C

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58. If $f(x) = \begin{cases} 1 - kx & x \leq 3 \\ 2x + 3 & x > 3 \end{cases}$ is a continuous function, then the value of k is

A. $\frac{8}{3}$

B. $-\frac{8}{3}$

C. $\frac{3}{8}$

D. None of these

Answer: B

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59. If $f(x) = \begin{cases} \frac{\tan 3x}{x} & x \neq 0 \\ 4k & x = 0 \end{cases}$ is continuous at `x=0' then K=

A. 3

B. $\frac{3}{4}$

C. $\frac{4}{3}$

D. 12

Answer: B

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60. $\frac{d}{dx}\{\tan^{-1}\sqrt{x}\}$=

A. 1/(2sqrtx(1+x)

B. 1/(1+x)

C. 1/(2(sqrtx+x)

D. (1)/(2x(x+1))

Answer: A

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61. The value of $\int \frac{dx}{16x^2 - 25}$ is

A. $\frac{1}{20}\log\left|\frac{4x-5}{4x+5}\right| + C$

B. $\frac{1}{30}\log\left|\frac{4x-5}{4x+5}\right| + C$

C. $\frac{1}{40}\log\left|\frac{4x-5}{4x+5}\right| + C$

D. None of these

Answer: C

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62. $\int e^x(\cos x - \sin x)dx =$

A. $-e^x \cos + C$

B. $e^x \sin x + C$

C. $-e^x \cos + C$

D. $e^x \cos x + C$

Answer: D

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63. the differential equation of order 3 and degree 2 is

A. $\left(\frac{d^2y}{dx^2}\right)^3 + 3y = 0$

B. $\left(\frac{d^3y}{dx^3}\right)^2 + y = 0$

C. $\left(\frac{d^3y}{dx^3}\right)^2 + y^2 = 0$

D. $\frac{d^2y}{dx^2} + 3y^3 = 0$

Answer: B

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64. If $\vec{a} = 3\hat{i} - \hat{j} + 2\hat{k}$ and $\vec{b} = \hat{i} - 3\hat{k}$ then veca.vecb is

A. 3

B. -3

C. 4

D. None of these

Answer: B

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65. for what value of lambda, the vectors $\overrightarrow{a} = 3\hat{i} - \hat{j} + 4\hat{k}$, $b = \lambda\hat{i} + 3\hat{j} + 3\hat{k}$ are perpendicular to each other

A. 3

B. -3

C. 0

D. 0.05

Answer: B

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66. The direction ratios of a line normal to the plane $x + 2y - 3z + 4 = 0$ are

A. 1,-2,3

B. 1,-2,-3

C. 1,2,-3

D. None of these

Answer: C

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67. The d.r of the line $\frac{4-x}{2} = \frac{3-y}{5} = \frac{z+1}{6}$ are

A. larr2,5,6gt

B. lt2,5,6gt

C. larr2,-5,6gt

D. larr2,5,-6gt

Answer: C

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68. The Solution set of the inequation $x + 2y > 3$ is

A. upper plane containing the origin

B. upper half plane not containing the origin

C. first quadrant

D. none of this

Answer: B

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69. From a bag containing 4 red and 2 white balls two balls are drawn. The probability that both the balls are red is:

A. $\frac{1}{5}$

B. $\frac{2}{5}$

C. $\frac{3}{5}$

D. None of these

Answer: B

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70. If xRy for a symmetric relation then it is necessary that _____

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71. For $[aij]_{m \times n}$ is a square matrix if _____

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72. $\begin{vmatrix} 2x & 5 \\ 8 & x \end{vmatrix} = \begin{vmatrix} 6 & 5 \\ 8 & 3 \end{vmatrix}$,then x = _____

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73. $\frac{d}{dx}\left(e^{e^x}\right)$ = _____

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74. $f(x) = x^3 - 12x$ is strictly decreasing in _____

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75. $\int \frac{dx}{\sin^2 x \cos^2 x}$ equals :

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76. Order of $\left(\frac{dy}{dx}\right)^2 + \frac{1}{\frac{dy}{dx}} = 3$ is _____

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77. Two events A and B are independent if $P(A \cap B)$ = _____

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78. State wheter is true or false: $\sec^{-1}(\sec x) = x, x \in [0, \pi] - \left[\frac{\pi}{2}\right]$

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79. If A is 3×4 matrix and B is 4×3 matrix,then the order of AB is

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80. State wheter is true or false: $\frac{d}{dx}\left\{e^{f(x)}\right\} = e^{f(x)}\frac{d}{dx}(f(x))$

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81. State wheter is true of false: $\int \frac{\sin^2 x}{1+\cos x} dx$ = $x - \sin x + C$

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82. State wheter is true or false:$y^2 = 4ax$ is a solution of $2xy_1 = y$

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83. State wheter is true or false: If $\vec{a}$, $\vec{b}$ be two vectors then $\left|\vec{a} + \vec{b}\right|$ is $\left|\vec{a}\right| + \left|\vec{b}\right|$

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84. State wheter is true or false: The direction cosines of the line joining $(1, 0, 0)$ and $(0, 1, 1)$ is $< -1, 1, 1 >$

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85. State wheter is trure or false : If E and F are mutually exclusive events then P $P(E \cup F) = P(E) + P(F)$

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86. If A = $\begin{bmatrix} k & 0 \\ 1 & 1 \end{bmatrix}$,B = $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$,find k of $A^2 = B$

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87. If A = $\begin{bmatrix} 3 & 2 & -3 \\ 2 & -1 & 1 \\ 4 & 3 & 2 \end{bmatrix}$ then find $A(adjA)$

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88. Find a point on the curve $y = (x-2)^2$ at which the tangent is parallel to the chord joining the points (2,0) and (4,4)

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89. Integrate $\int \frac{\cos x - \cos 2x}{1 - \cos x}$

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90. Evaluate: $\int_0^1 \frac{\tan^{-1} x}{1+x^2} dx$

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91. Find the area of the region bounded by the curve $y^2 = 4x$, y-axis and y = 3

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92. If veca and vecb are unit vectors inclined at an angle theta then prove that $\cos\left(\frac{\theta}{2}\right) = \frac{1}{2}\left|\vec{a} + \vec{b}\right|$

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93. Find the area of parallelogram whose diagnolas are $2\hat{i} + 3\hat{j} + 6\hat{k}$ and $3\hat{i} - 6\hat{j} + 2\hat{k}$

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94. Solve the Equation :

$$\tan^{-1}\left(\frac{x-1}{x+2}\right)+\tan^{-1}\left(\frac{2x-1}{2x+1}\right)=\frac{\tan^{-1}23}{36}$$

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95. Differentiate $\tan^{-1}\left(\frac{x}{1+\sqrt{1-x^2}}\right)$ with respect to $\sin\left[(2\cot^{-1})\sqrt{\frac{1+x}{1-x}}\right]$

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96. If x = a(cos 2theta + 2theta sin 2theta) and y = a(sin 2theta - 2theta cos 2theta),then find the value of $\frac{d^2x}{d^2y}$ at theta = $\frac{\pi}{4}$

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97. Evaluate $\int \frac{x^2}{x^4 + x^2 - 2} dx$

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98. Evaluate $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \frac{x \sin x}{1 + e^x} dx$

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99. Solve the differential equation:

$x \sin\left(\frac{y}{x}\right) \frac{dy}{dx} + x - y \sin\left(\frac{y}{x}\right) = 0, y(1) = \frac{\pi}{2}$

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100. Solve the differential equation :

$(2x - 2y + 5)dy = (x - y + 3)dx$

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101. Give three identical boxes I , II and III, each containing two coins. In box I both coins are gold coins, in box II both are silver coins and in box III there is one gold and one silver coin. A person chooses a box at random and takes out a coin. If the coin is of gold, what is the probability that the other coin in the box is also of gold ?

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102. Solve by matrix method $x - y + 2z = 7$

$3x + 4y - 5z = -5\ 2x - y + 3z = 12$

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103. If $A = \begin{bmatrix} -1 & 2 & 0 \\ -1 & 1 & 1 \\ 0 & 1 & 0 \end{bmatrix}$, show that $A^3 = I$, Also Find A^-1

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104. Find the shortest distance between the lines $\vec{r} = \hat{i} + 2\hat{j} + 3\hat{k} + \lambda\left(\hat{i} - 3\hat{j} + 2\hat{k}\right)$ and $\vec{r} = 4\hat{i} + 5\hat{j} + 6\hat{k} + \lambda\left(2\hat{i} + 3\hat{j} + \hat{k}\right)$

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105. Find image of point (1,6,3) on the line $\frac{x}{1} = \frac{y-1}{2} = \frac{z-2}{3}$

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106. Maximise $z = 1000x + 500y$ Subject to constraints $3x + 5y \leq 225, 2x + y \leq 80$

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107. Select the Correct Option $a * b = a + 2b^2$ then 3*2

A. 11

B. 14

C. 15

D. 8

Answer: A

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108. Select the Correct Option If value of cos(sec^-1{:5/3:}) is:

A. (5/3)

B. (3/5)

C. (4/5)

D. (5/4)

Answer: B

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109. Select the Correct Option If A is any matrix of order 2×3 and B is any matrix of order 3×4 in order of (AB)' is

A. 4×2

B. 2×4

C. 2×3

D. 3×2

Answer: A

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110. Select the Correct Option If A is an invertible matrix of order 2, then det(A^-1) is equal to

A. 0

B. detA

C. 1

D. 1/detA

Answer: D

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111. Select the Correct Option If $3axy = c$, then dy/dx=

A. -x/y

B. -y/x

C. 0

D. c/(3a)

Answer: B

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112. Select the Correct Option $f(x) = \begin{cases} \frac{\sin kx}{2x} & x \neq 0 \\ 3 & (x = 0)at(x = 0) \end{cases}$ is continuous then k+2=

A. 6

B. 8

C. (3/2)

D. 4

Answer: B

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113. Select the Correct Option d/dx {log(logx)}=

A. 1/logx

B. 1/(xlogx)

C. 1/x

D. xlogx

Answer: D

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114. Select the Correct Option The value of $\int \frac{dx}{1-9x^2}$ is

A. 1/6log|(1+3x)/(1-3x)|+C

B. 1/3log|(1+3x)/(1-3x)|+C

C. 1/9log|(1+3x)/(1-3x)|+C

D. None of these

Answer: A

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115. $\int \frac{dx}{\sqrt{1-x^2}}$ is equal to :

A. log|x+sqrt(1-x^2)|+C

B. sin^-1x+C

C. tan^-1x+C

D. cos^-1x+C

Answer: B

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116. The order and degree of the differential equation $\left(\frac{dy}{dx}\right)^4 + 3y\frac{d^2y}{dx^2} = 0$ are

A. order 1, degree 2

B. order 2, degree 1

C. order 2, degree 4

D. order 4, degree 2

Answer: B

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117. The projection of vectors $\overrightarrow{a} = 2\hat{i} + 3\hat{j} + 2\hat{k}$ on $vacb = \hat{i} + 2\hat{j} + \hat{k}$ is :

A. sqrt5/6

B. 2/3sqrt6

C. sqrt3/2

D. 5/3sqrt6

Answer: D

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118. For what value of λ, the vectors $(\lambda - 2)\vec{a} + \vec{b}$ and $(4\lambda - 2)\vec{a} + 3\vec{b}$ are collinear

A. 2

B. 2, -4

C. 4

D. -4

Answer: D

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119. The direction-cosines of the line joining (2, -4, 5) and (0, -6, 4) are

A. 2, 2, 1

B. (-2, -2, -1)

C. 2/3, 2/3, 1/3

D. None of these

Answer: C

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120. Distance of the point (2,5,-3) from the plane $\vec{r}.\left(6\hat{i}-3\hat{j}+2\hat{k}\right)=4$ is

A. (13/7)

B. (12/7)

C. (15/7)

D. (11/7)

Answer: A

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121. Any point in half plane $2x + 3y - 12 \geq 0$ is

A. (0,-12)

B. (12,0)

C. (4,0)

D. (0,-4)

Answer: B

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122. In tossing of a pair of dice, the probability of getting an odd number greater than 2 on each die is :

A. (1/3)

B. (1/9)

C. (1/6)

D. (1/4)

Answer: B

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123. Fill in the Blanks Let {:RrarrR defined by $f(x) = \frac{1}{2+\cos x}$ x= R then range of is .....

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124. Fill in the Blanks If $A = \begin{bmatrix} 2 & -1 \\ 4 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & 3 \\ -2 & 1 \end{bmatrix}$ then 2A+B=.....

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125. $\frac{d}{dx}\left[\sin^{-1}(\cos x)\right]$=

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126. Fill in the Blanks $f(x) = x^3 - 3x^2 + 3x$ is strictly increasing in .....

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127. Fill in the Blanks $\int \sec^2(4x - 5)dx =$ .....

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128. Fill in the Blanks The degree of diff. equation $\left(\frac{d^2y}{dx^2}\right)^2 + \frac{dy}{dx} = \sin\left(\frac{dy}{dx}\right)$ is .....

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129. Fill in the Blanks If $P(A)=\frac{1}{5}, \quad P(B)=\frac{3}{10}$, $P(A \cap B)=\frac{3}{25}$ then $P(A \cup B)$ is ...

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130. State whether it is true or false Domain of sin^-1x is [-pi/2,pi/2]

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131. State whether it is true or false If A is a singular matrix then $|A|=0$.

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132. State whether it is true or false $\frac{d}{dx}\{(\log_a f(x))\} = \left(\frac{1}{f'(x)}\right)\frac{d}{dx}\{f(x)\}$

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133. State whether it is true or false $\int_2^3 \frac{dx}{x^2-1} = \log\left(\frac{4}{3}\right)$

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134. State whether it is true or false $y = \tan^{-1} x + C$ is a solution of $\left(x^2+1\right)\frac{dy}{dx} = 1.$

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135. State whether it is true or false If $\vec{a}$, $\vec{b}$ are two vectors then $\left|\vec{a}.\ \vec{b}\right| \leq \left|\vec{a}\right|\left|\vec{b}\right|$

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136. State whether it is true or false The equation of line passing through $(1,\ -1, 4)$ and parallel to $\left(2\hat{i}+\hat{j}-3\hat{k}\right)$ is $\frac{x-2}{1}=\frac{y-1}{-1}=\frac{z+3}{4}$

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137. State whether it is true or false If $P(A)=0$, $P(B)=\frac{2}{3}$ then $P\left(\frac{A}{B}\right)=0$

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138. For any 2×2 matrix, If $A.(adjA) = \begin{bmatrix} 8 & 0 \\ 0 & 8 \end{bmatrix}$ then find |A|.

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139. If $A = \begin{bmatrix} 3 & -3 \\ -3 & 3 \end{bmatrix}$ and $A^2 = \lambda A$ then find lambda.

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140. Find a point on the curve $y = (x-2)^2$ at which the tangent is parallel to the chord joining the points (2,0) and (4,4)

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141. Integrate $\int \tan^{-1}\left(\frac{\sin 2x}{1+\cos 2x}\right)dx$

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142. Find the area of region bounded by curve $x^2 = y$ and $y = 4$.

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143. If $\vec{a} = 2\hat{i} - \hat{j} + \hat{k}$, $\vec{b} = \hat{i} + 3\hat{j} - 2\hat{k}$ and $\vec{c} = 3\hat{i} + \hat{j} - \hat{k}$ then show that $\left(\vec{a} \times \vec{b}\right).\vec{c} = \vec{a}.\left(\vec{b} \times \vec{c}\right)$

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144. If veca and vecb are perpendicular vectors, $\left|\vec{a}+\vec{b}\right|=13, \left|\vec{a}\right|=5$ then find |vecb|`.

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145. Solve : $\cot^{-1}(2x)+\cot^{-1}(3x)=\frac{\pi}{4}$

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146. If $y\sqrt{1-x^2}+x\sqrt{1-y^2}=1$, then prove that $\frac{dy}{dx}=-\sqrt{\frac{1-y^2}{1-x^2}}$

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147. If $y = \sin\left(m \sin^{-1} x\right)$, prove that $\left(1 - x^2\right) y_2 - x y_1 + m^2 y = 0$

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148. Evaluate : $\int e^x \left(\frac{\sin 4x - 4}{1 - \cos 4x} \right) dx.$

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149. Prove that : $\int_0^{\pi} \frac{x \tan x}{\sec x \cos ecx} dx = \frac{\pi^2}{4}.$

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150. Solve $x \cos\left(\frac{y}{x}\right) dy = \left\{ y \cos\left(\frac{y}{x}\right) + x \right\} dx$

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151. Find the solution of the differential equation $(x+y+1)^2 dy = dx$.

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152. A man is known to speak truth 3 out of 4 times. He throws a die and reports that it is a six. Find the probability that it is actually six.

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153. Solve by matrix method $2x + 3y + 3z = 5$

$x - 2y + z = -4\ 3x - y - 2z = 3$

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154. If $A = \begin{bmatrix} 3 & 7 \\ 2 & 5 \end{bmatrix}, B = \begin{bmatrix} 6 & 8 \\ 7 & 9 \end{bmatrix}$ then verify $(AB)^{-1} = B^{-1}A^{-1}$.

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155. Find shortest distance between lines $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4}$ and $\frac{x-2}{3} = \frac{y-4}{4} = \frac{z-5}{5}$

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156. Find image of the point (1,0,3) to the line joining points (4,7,1) and (3,5,3) .

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157. Maximise $z = 102x + 135y$ subject to $x + y \leq 300$, $2x + 3y \leq 720$, $x, y, \geq 0$

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158. if $a \cdot b = 2a^2 + ab$ then $2 \cdot 5$ =

A. 19

B. 24

C. 15

D. 18

Answer: D

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159. the principal value of $\sin^{-1}\left(-\frac{\sqrt{3}}{2}\right)$ is

A. $-2\frac{\pi}{3}$

B. $-\frac{\pi}{3}$

C. $4\frac{\pi}{3}$

D. $5\frac{\pi}{3}$

Answer: B

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160. If $\begin{bmatrix} 3 & -4 \\ 1 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 3 \\ 11 \end{bmatrix}$, then write the correct answer from· the following :

A. 2

B. 5

C. 3

D. 8

Answer: D

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161. Let A be a non-singular square matrix of order 3×3. Then abs(adjA) is

A. abs(A)^3

B. abs(A)

C. 3abs(A)

D. abs(A)^2

Answer: D

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162. if `y=sec(tan^(-1)x), then (dy)/dx is equal to

A. $\frac{x}{1+x^2}$

B. $x\sqrt{1+x^2}$

C. $\frac{1}{s}qft\left(1+x^2\right)$

D. $\frac{x}{\sqrt{1+x^2}}$

Answer: D

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163. $f(x)=\begin{cases}\frac{x^2-4}{x-2} & x\neq 2\\ 2k & x=2\end{cases}$ is continuous at x=2 then k=

A. 4

B. 5

C. 6

D. 2

Answer: D

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164. $\frac{d}{dx}(\log \tan x)=$

A. $2 \sin 2x$

B. $2 \cos ecx$

C. $2 \cos ec2x$

D. $2 \sin x$

Answer: C

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165. the value of $\int \frac{dx}{x^2 - a^2}$ is:

A. $\log\left|x^2 - a^2\right| + c$

B. $\frac{1}{2a}\log|(x - a) - (x + a)| + c$

C. $2\frac{x}{(x^2 - a^2)^3}$

D. $\log\left|\frac{x - a}{x + a}\right| + c$

Answer: B

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166. the value of $\int \frac{\log x}{x} dx$=

A. $\log x + C$

B. $\int \frac{\log x^2}{x} + C$

C. $2\log x + C$

D. $\frac{1}{x} + C$

Answer: B

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167. the order and degree of the differential equation $\frac{d^2y}{dx^2} + \frac{\left(\frac{dy}{dx}\right)^1}{3} + x = 0$ are respectively

A. 2, 3

B. 3, 3

C. 2, 2

D. 2, 4

Answer: A

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168. if $\left|\vec{a}\right| = 3, \left|\vec{b}\right| = 2$ and $\vec{a} . \vec{b} = 3,$ then angle between veca and vecb is:

A. $\frac{\pi}{2}$

B. $\frac{\pi}{3}$

C. $\frac{\pi}{4}$

D. $\frac{\pi}{6}$

Answer: B

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169. the angle between vectors $\vec{a} \times \vec{b}$ and $\vec{b} \times \vec{a}$ is

A. 180°

B. 90°

C. 0°

D. 45°

Answer: A

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170. the direction cosines of a line equally inclined to the co-ordinate axes are:

A. $1, 1, 1$

B. $\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}$

C. $\pm\frac{1}{3}, \pm\frac{1}{3}, \pm\frac{1}{3}$

D. $\pm\frac{1}{\sqrt{3}}, \pm\frac{1}{\sqrt{3}}, \pm\frac{1}{\sqrt{3}}$

Answer: D

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171. the distance between $2x + 3y + 4 = 0$ and $4x + 6y - 12 = 0$ is

A. $\frac{2}{\sqrt{21}}$

B. $\frac{3}{\sqrt{21}}$

C. $\frac{2}{\sqrt{29}}$

D. $\frac{4}{\sqrt{29}}$

Answer: C

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172. the point lies in half plane $x - 2y < 0$ as

A. (5,2)

B. (3,1)

C. (4,1)

D. (-1,0)

Answer: D

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173. from a bag containing 4 red and 2 black balls, two balls are drawn. the probability of getting two black balls is:

A. $\frac{1}{2}$

B. $\frac{1}{3}$

C. $\frac{1}{6}$

D. $\frac{1}{15}$

Answer: D

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174. Fill in the blanks: the Identity elements of $a \cdot b = a + b - 4$, for $ab \in z$ is _____.

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175. fill the blanks: if P is a matrix of order 2×4 and Q is of 4×3 then order of (PQ)' is _____.

Watch Video Solution

176. fill in the banks: if $|A| = 4$ then abs(3A)=_____ where A is a of order 3×3.

Watch Video Solution

177. $\frac{d}{dx}\left\{\sin^{-1} x^2\right\}$ = _____.

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178. filling the blanks: the slope of normal to the curve $x^2 + y^2 = 25$ at (-3,4) is _____.

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179. fill in the blanks: $\int \frac{dx}{\sqrt{5x+3}}$ = _____.

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180. Fill in the blanks: the differentiate equation of $y = c.\sin x$ is _____.

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181. Fill in the blanks: if A and B are mutually exclusive events such as that $P(A) = \frac{1}{2}$, $P(B) = p$ and $P(A \cup B) = \frac{3}{4}$ then p is _____.

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182. state whether it is true or false: Domain of $\tan^{-1} xis\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

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183. State whether it is true or false: every square Matrix can be represented as sum of symmetry and skew symmetric matrix.

Watch Video Solution

184. State whether it is true or false: $\frac{d}{dx}\{\sin^{-1}(f(x))\} = \frac{1}{\sqrt{1-(f(x))^2}}$

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185. $\int_1^{\sqrt{3}} \frac{dx}{1+x^2}$ equals :

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186. state whether it is true or false: the differential equation of all lines in a plane is $\frac{d^2y}{dx^2} = 0$

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187. state whether it is true or false: projection of a vector veca on vecb is $\vec{a} . \vec{b}$

Watch Video Solution

188. state whether it is true or false: the point of the line $\frac{2x-1}{3} = \frac{4-y}{1} = \frac{3z+6}{6}$ from which line passes is (1/2, 4, -2).

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189. state whether it is true or false: If a and b are any two events then $P\left(\frac{A}{B}\right)P(B) = P(A \cap B)$.

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190. for the matrix A= [(3,2),(1,1),], find x and y such that $A^2 + xA + yI = 0$.

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191. if area of triangle is 35sq.unit with vertices (2,-6) (5,4) and (K,4) find K.

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192. find the interval in which $f(x) = \cos\left(2x + \frac{\pi}{4}\right)$ is strictly increasing.

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193. if $f'(x) = 3x^2 - \frac{2}{x^3}$ and $f(1) = 0$, find f(x).

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194. find the region bounded by line $2y = -x + 8$ and axes.

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195. find angles between veca and vecb with magnitudes 1 and 2 and when $\left|\vec{a} \times \vec{b}\right| = \sqrt{3}$.

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196. find a vector of magnitude 6, which is perpendicular to $4 \cap i - \cap j + 3 \cap k$ and $-2 \cap i + \cap j - 2 \cap k$.

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197. Prove that $\sin^{-1}\left(\frac{4}{5}\right) + \sin^{-1}\left(\frac{5}{13}\right) + \sin^{-1}\left(\frac{16}{65}\right) = \frac{\pi}{2}$.

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198. If $\sin y = x \sin(a + y)$, prove that $\frac{dy}{dx} = \frac{\sin^2(a + y)}{\sin a}$

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199. If $y = \log\left(x + \sqrt{x^2+1}\right)$, $provet\hat{:}\ (x^2+1)d^2\frac{y}{dx^2} + x\frac{dy}{dx} = 0$

.

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200. Evaluate: $\int e^{-\frac{x}{2}} \frac{\sqrt{1-\sin x}}{1+\cos x} dx$

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201. Evaluate $\int_{\pi/6}^{\pi/3} \left(\frac{1}{1+\sqrt{\tan x}} \right.$ dx

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202. Solve the following differential equation : $(1+x^2)\frac{dy}{dx}+y=\tan^{-1}x$

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203. Show that the differential equation : $2ye^{\frac{x}{y}}dx+\left(y-2xe^{\frac{x}{y}}\right)dy=0$ is homogeneous and find its particular solution given that $x=0$when $y=1$

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204. A girl throws a die. If she gets 5 or 6, tosses a coin three times and notes the number of heads. If she gets 1,2,3 or 4, she tosses a coin two times and notes the number of

heads. If she obtained exactly two heads, what is the probability that she throws 1,2,3 or 4 with the die.

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205. Solve by matrix method. $\frac{1}{x}+\frac{2}{y}-\frac{3}{z}=-4$ $\frac{2}{x}+\frac{3}{y}+\frac{2}{z}=2\frac{3}{x}-\frac{1}{y}-\frac{4}{z}=11$

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206. If $A=\begin{bmatrix}2 & -3\\ 3 & 4\end{bmatrix}$, show that $A^2-6A+17I=0$,

Hence find A^-1

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207. Find the vector equation of the plane passing through the points (2,5,-3),(-2,-3,5) and (5,3,-3).

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208. Find the equation of the plane which contain the line of intersection of the plane $\vec{r}.\left(\hat{i}+2\hat{j}+3\hat{k}\right)-4=0$ and $\vec{r}.\left(2\hat{i}+\hat{j}-\hat{k}\right)+5=0$ and which is perpendicular to the plane $5x+3y-6z+8=0$.

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209. Maximize $z=11x+3y$ subject to $2x+y\leq 6, x\leq 2, x, y>0$.

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210. If a*b=LCM of (a,b) then 4*6

A. 24

B. 12

C. 8

D. 6

Answer: B

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211. Range of tan^(-1)x=

A. [-pi/2,pi/2]

B. [0,pi]

C. (-pi/2,pi/2)

D. (0,pi)

Answer: C

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212. Let A, B be matrics of order 3x3 such that A' =-A and B'=B then matrix $\lambda AB + 3BA$ is skew symmetric if lamda =

A. 3

B. -3

C. 3,-3

D. None

Answer: A

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213. If A is any square matrix of order 3x3 such that $|A| = 3$, then the value of $|adjA|$

A. 3

B. (1/3)

C. 9

D. 27

Answer: C

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214. The derivative of logx w.r.t. x^2 is

A. 1/(2x^2)

B. x/2

C. x^2/2

D. 1/(2x)

Answer: A

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215. Find a if $f(x) = \begin{cases} \frac{\sqrt{5x+2}-\sqrt{4x+4}}{x-2} & x \neq 2 \\ a & x = 2 \end{cases}$ is continuous as x=2

A. 1/(2sqrt3)

B. 1/sqrt3

C. 2/sqrt3

D. 1/(4sqrt3)

Answer: D

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216. $\frac{d}{dx}\{|4x-3|\} =$

A. 4/abs(4x-3)

B. (4(4x-3))/abs(4x-3)

C. (4x-3)/abs(4x-3)

D. 1/abs(4x-3)

Answer: B

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217. $\int \frac{dx}{\sqrt{9-25x^2}}$

A. $\sin^{-1}\left(\frac{5x}{3}\right)+c$

B. $\frac{1}{5}\sin^{-1}\left(\frac{5x}{3}\right)+c$

C. $\frac{1}{6}\sin^{-1}\left(\frac{3+5x}{3-5x}\right)+c$

D. $\frac{1}{30}\log\left(\frac{3+5x}{3-5x}\right)+c$

Answer: B

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218. $\int \frac{e^{2\sin^{-1}x}}{\sqrt{1-x^2}} = dx =$

A. $\frac{1}{2}e^{2\sin^{-1}x} + c$

B. $e^{2\sin^{-1}x} + c$

C. $\frac{e^{2\sin^{-1}x}}{\sqrt{1-x}} + c$

D. $2e^{2\sin^{-1}x} + c$

Answer: A

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219. The number of arbitrary constants in the particular solution of a diff. equation of order 2 in 2.

A. 2

B. 3

C. 1

D. 0

Answer: D

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220. Find λ and μ if :

$\left(2\hat{i}+6\hat{j}+27\hat{k}\right)\times\left(\hat{i}+\lambda\hat{j}+\mu\hat{k}\right)=\overrightarrow{0}.$

A. p=6,q=27

B. p=3,q=(27/2)

C. p=6,q=(27/2)

D. p=3,q=27

Answer: B

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221. Find lambda so that the scalar projection of $\vec{a} = \lambda\hat{i} + \hat{j} + 4\hat{k}$ on $\vec{b} = 2\hat{i} + 6\hat{j} + 3\hat{k}$ is 4units

A. 5

B. 4

C. 3

D. 6

Answer: A

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222. What is the distance (in units) between the two planes $3x + 5y + 7z = 3$ and $9x + 15y + 21z = 9$:

A. 0

B. 3

C. 6/sqrt 83

D. 6

Answer: A

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223. If $\cos\alpha, \cos\beta, \cos\gamma$ are the direction-cosines of a line, then the value of $\sin^2\alpha + \sin^2\beta + \sin^2\gamma =$

A. 1

B. 0

C. -1

D. 2

Answer: D

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224. Any point in half plane $2x + 3y - 12 \geq 0$ is

A. (1,2)

B. (2,1)

C. (2,3)

D. (-3,2)

Answer: C

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225. An urn contains 6 balls of which two are red and four are black. Two balls are drawn at random. Probability that they are of the different colours is :

A. (2/5)

B. (1/15)

C. (8/15)

D. (4/15)

Answer: C

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226. Fill in the Blanks : Every identity element is an .....

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227. Fill in the Blanks : If $A = \begin{bmatrix} 0 & 1 & 2 \\ -1 & 0 & 3 \\ x & -3 & 0 \end{bmatrix}$ is skew symmetric matrix then $x + 2 =$ .....

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228. If area of triangle is 35 sq. units with vertices (2,-6), (5, 4) and (k,4) then k is :

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229. The second order derivative of $\frac{1}{x}$ is _____

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230. If the tangent is parallel to x axis then slope = _____

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231. $\int \frac{\sec^2\left(3\tan^{-1}x\right)}{1+x^2}dx =$ _____

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232. The diff. equation of $y = kx^2$ is _____

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233. A fair dice is rolled.The events are E = {1,2,3} F = {3,5},then P(E/F) is _____

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234. State whether it is true or false: $\cos^{-1}\left(-\frac{1}{2}\right) = -\frac{\pi}{3}$

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235. State whether it is true or false: If $|A| = 9$ then $|A^{-1}| = \frac{1}{9}$

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236. State whether it is true or false: The second order derivative of log x is $-\frac{1}{x^2}$

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237. State whether it is true or false: $\int \frac{dx}{9x^2 + 4} = \frac{1}{3}\tan^{-1}\left(\frac{2x}{3} + C\right)$

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238. State whether it is true or false: The no. of arbitary constants in the general solution of a differential equation of order 3 is 3.

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239. State whether it is true or false: If two vector veca and vecb are perpendicular to each other then veca > vecb.

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240. State whether it is true or false: They angle between diagonals of a cube is $\cos^{-1}\left(\frac{1}{3}\right)$.

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241. State whether it is ture or false: If A and B are independent events then P(A nn B) = P(A) + P(B).

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242. If A = $\begin{bmatrix} 2 & -3 \\ 4 & 5 \end{bmatrix}$,B = $\begin{bmatrix} 3 & 2 \\ -1 & 2 \end{bmatrix}$,then AB != BA.

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243. If A = $\begin{bmatrix} 2 & 1 \\ 3 & 4 \end{bmatrix}$,B = $\begin{bmatrix} 5 & 6 \\ 1 & -2 \end{bmatrix}$,then verify |AB| = |A| |B|.

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244. Find the intervals in which f(x) = 2x^3+9x^2+12x+20 is increasing or decreasing.

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245. Solve $\int \frac{dx}{x^2+6x+13}$.

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246. Evaluate : $\int \frac{\sin x + \cos x}{\sqrt{\sin 2x}} dx$.

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247. Find the area enclosed by the circle $x^2 + y^2$ =1.

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248. If veca + vecb + vecc = 0 and |veca|=3,|vecb|= 5,|vecc|=7,then find the value of $\vec{a}.\vec{b}+\vec{b}.\vec{c}+\vec{c}.\vec{a}$.

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249. Find the area of triangle with vertices (1,1,2),(2,3,5), (1,5,5).

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250. If $y\sqrt{1-x^2}+x\sqrt{1-y^2}=1$, then prove that $\frac{dy}{dx}=-\sqrt{\frac{1-y^2}{1-x^2}}$

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251. If x = $a(\cos 2\theta + 2\theta \sin 2\theta)$ and y = $a(\sin 2\theta - 2\theta \cos 2\theta)$,find $\left(d^2 \frac{y}{dx^2}\right)$ at theta = $\frac{\pi}{8}$

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252. Solve the differential equation $xdy - ydx = \sqrt{x^2 + y^2}dx$

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253. Evaluate $\int_1^3 |x^2 - 2x|dx$

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254. There see three coins,one is a two headed coin (having head on both the faces),another is a biased coin that comes up heads 75% of the time and the third is anunbiased coin.One of the three coins is choosen at random and tossed.Of it shows head,what is probability that it was the two headed coin?

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255. Find $\int \left(\sin^{-1} x\right)^2 dx$

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256. Solve the following system of linear equations by matrix method :

$3x - 2y + 3z = 8, 2x + y - z = 1, 4x - 3y + 2z = 4$

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257. Given A= $\begin{bmatrix} 5 & 0 & 4 \\ 2 & 3 & 2 \\ 1 & 2 & 1 \end{bmatrix}$,find $(A)^{-1}$.

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258. Find equation of a plane passing through the points $(2, 1, 0)$,(3,-2,-2) and (3,1,7)`

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259. Find the shortest distance between the lines. $\frac{x-8}{3}.\frac{y+9}{-16}=\frac{z-10}{7}$ and $\frac{x-15}{3}=\frac{y-29}{8}=\frac{z-5}{-5}$.

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260. Maximise z = $10x+6y$,Subject to $3x+y\leq 12$, $3x+5y\leq 34$,x,y>,0.

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