MATHS

BOOKS - MHTCET PREVIOUS YEAR PAPERS AND PRACTICE PAPERS

PRACTICE SET 23

Paper 2 Mathematics

1. If $x = \sin^{-1}\left(3t - 4t^3\right)$ and $y = \cos^{-1}\sqrt{1 - t^2}$ then $\frac{dy}{dx} =$

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

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

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

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

Answer: D

Watch Video Solution

2. A and B are two events such that odds odds against A are 2 : 1 odds in favour of $A \cup B$ are 3 : 1. If $x \leq P(B) \leq y$, then the ordered pair (x, y) is

A. $\frac{1}{2} \leq P(B) \leq \frac{3}{4}$

B. $\frac{5}{12} \leq P(B) \leq \frac{3}{4}$

C. $\frac{1}{4} \leq P(B) \leq \frac{3}{5}$

D. None of the above

Answer: B

Watch Video Solution

3. If a line makes angle α, β and γ with the coordinate axes respectively, then $\cos 2\alpha + \cos 2\beta + \cos 2\gamma =$

A. 3

B. -2

C. 2

D. -1

Answer: D

Watch Video Solution

4. If $2x - 4y = 9$ and $6x - 12y + 7 = 0$ are parallel tangents to circle, then radius of the circle, is

A. $\frac{\sqrt{3}}{5}$

B. $\frac{17}{6\sqrt{5}}$

C. $\frac{\sqrt{2}}{3}$

D. $\frac{17}{3\sqrt{5}}$

Answer: B

Watch Video Solution

5. A proposition is called a taulogoy, if it

A. always true

B. always true

C. sometimes T, sometimes F

D. None of the above

Answer: A

Watch Video Solution

6. A=$\begin{bmatrix} 0 & 3 \\ 2 & 0 \end{bmatrix}$ and $A^{-1} = \lambda$ (adj, A) then λ is equal to

A. $-1/6$

B. $1/3$

C. $-1/3$

D. $1/6$

Answer: A

Watch Video Solution

7. The equation of the straight line joining the origin to the point of intersection of $y - x + 7 = 0$ and $y + 2x - 2 = 0$ is

A. 3x+y=0

B. 3x-4y=0

C. 4x-3y=0

D. 4x+3y=0

Answer: D

Watch Video Solution

8. The valume of the parallelopiped whose coterminous edges are $\hat{i}-\hat{j}+\hat{k}, 2\hat{i}-4\hat{j}+5\hat{k}$ and $3\hat{i}-5\hat{j}+2\hat{k}$, is

A. 4 cu unit

B. 3 cu unit

C. 2 cu unit

D. 8 cu unit

Answer: D

Watch Video Solution

9. The circles $x^2 + y^2 - 6x - 8y = 0$ and $x^2 + y^2 - 6x + 8 = 0$ are

A. interesting in two points

B. non-interesting

C. touching externally

D. touching internally

Answer: D

Watch Video Solution

10. The points of discontinuity of tan x are

A. $n\pi, n \in I$

B. $2n\pi, n \in I$

C. $(2n+1)\frac{\pi}{2}, n \in I$

D. None of the above

Answer: C

Watch Video Solution

11. The minimum value of $f(x) = e^{\left(x^4 - x^3 + x^2\right)}$ is

A. e

B. e^2

C. 1

D. None of the above

Answer: C

Watch Video Solution

12. $\int_0^1 \frac{\tan^{-1} x}{x}$ dx equals

A. $\int_0^x \frac{x}{\sin x} dx$

B. $\frac{1}{2}\int_0^x \frac{x}{\sin x} dx$

C. $\int_0^{\pi/2} \frac{\sin x}{x} dx$

D. None of the above

Answer: B

View Text Solution

13. The order and degree of the differential equation $\left(1+3\frac{dy}{dx}\right)^{2/3} = 4\frac{d^3y}{dx^3} are$

A. $1, \frac{2}{3}$

B. 3,1

C. 3,3

D. 1,2

Answer: C

Watch Video Solution

14. The sum of the integers from 1 to 100 which are not divisible by 3 or 5 is

A. 2317

B. 2632

C. 315

D. 2489

Answer: C

Watch Video Solution

15. The value of $x_1 . (x_1{}' + x_2)$ is

A. $x_1 . x_2$

B. $x_1{}' x_2$

C. $x_1, x_2{}'$

D. None of the above

Answer: A

Watch Video Solution

16. The value of $2^{\frac{1}{4}} . 4^{\frac{1}{8}} . 8^{\frac{1}{16}}, , , , , , , \infty$ is equal to.

A. 1

B. 2

C. $3/2$

D. 4

Answer: B

Watch Video Solution

17. $\int \sec^4 x \cos ec^2 x dx$ is equal to

A. $\tan^2 x + 2\tan x - \cot x + c$

B. $\frac{\tan^3 x}{3} + 2\tan x - \cot x + c$

C. $\frac{\tan^2 x}{2} + 2\tan x - \cot x + c$

D. $\frac{\tan^2 x}{2} + 2\tan x - 2\cot x + c$

Answer: B

Watch Video Solution

18. $y = \sin^{-1}[\sqrt{x - ax} - \sqrt{a - ax}]$

A. $\frac{1}{\sin\sqrt{a - ax}}$

B. $\sin\sqrt{x}, \sin\sqrt{a}$

C. $\frac{1}{2\sqrt{x}\sqrt{1 - x}}$

D. 0

Answer: C

Watch Video Solution

19. A coin is tossed 5 times. The probability that at least one head turns up, is $\frac{1}{16}$ b. $\frac{2}{16}$ c. $\frac{14}{16}$ d. $\frac{15}{16}$

A. $\frac{1}{16}$

B. $\frac{2}{16}$

C. $\frac{14}{16}$

D. $\frac{15}{16}$

Answer: D

Watch Video Solution

20. The constraints $-x_1 + x_2 < 1, \ -x_1 + 3x_2 \leq 9, x_1, x_2 > , 0$ difines on

A. bounded feasible space

B. ubounded feasible space

C. both unbounded and bounded feasible space

D. None of the above

Answer: B

Watch Video Solution

21. If D, E and F be the middle points of the sides BC,CA and AB of the ΔABC, then $AD + BE + CF$ is

A. 0

B. 2B

C. 3AB

D. None of the above

Answer: A

Watch Video Solution

22. The eccentricity of the hyperbola $3x^2 - 4y^2 = -12$ is

A. $\sqrt{\frac{7}{3}}$

B. $\frac{\sqrt{7}}{2}$

C. $-\frac{\sqrt{7}}{3}$

D. $-\frac{\sqrt{7}}{2}$

Answer: A

Watch Video Solution

23. Equation $3x^2 + 7xy + 2y^2 + 5x + 3y + 2 = 0$

A. pair of straight lines

B. ellipse

C. hyperbola

D. None of the above

Answer: D

View Text Solution

24. Negation of "Ram of in class X or Rashmi is in Class XII" is

A. Ram is not in class X but Rashmi is in Class XII

B. Ram is not in class X and Rashmi is not in Class XII

C. Either Ram is not in class X or Rashmi is not in class XII

D. None of the above

Answer: B

 Watch Video Solution

25. The radius of the circle touching the straight lines $x - 2y - 1 = 0$ and $3x - 6y + 7 = 0$ is (A) $\frac{1}{\sqrt{2}}$ (B) $\frac{\sqrt{5}}{3}$ (C) $\sqrt{3}$ (D) $\sqrt{5}$

A. $\frac{3}{\sqrt{5}}$

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

C. $\sqrt{5}$

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

Answer: B

Watch Video Solution

26. If sets A and B defines as $A = \left\{(x, y), y = \frac{1}{x}, 0 \neq x \in R\right\}$ and B={(x,y):y=-x, $x \in R$ then

A. $A \cap B = A$

B. $A \cap B = B$

C. $A \cap B = \phi$

D. None of the above

Answer: C

Watch Video Solution

27. If $\log(x + y) = 2xy$ then $y'(0) =$

A. 1

B. -1

C. 2

D. 0

Answer: A

Watch Video Solution

28. $\int \frac{\sqrt{x}}{\sqrt{x}-3\sqrt{x}}dx$ is equal to

A.

$$6\left\{\frac{x}{6}+\frac{x^{6/5}}{5}+\frac{x^{1/2}}{2}+\frac{x^{1/3}}{3}+\log\left(x^{1/6-1}\right)\right\}+c$$

B.

$$6\left\{\frac{x}{6}+\frac{x^{6/5}}{5}+\frac{x^{1/2}}{3}+\frac{x^{1/3}}{2}+\log\left(x^{1/6-1}\right)\right\}+c$$

C.

$$6\left\{\frac{x}{6}+\frac{x^{6/5}}{5}+\frac{x^{2/3}}{4}+\frac{x^{1/2}}{3}+\frac{x^{1/3}}{2}+x^{1/6}\right\}+c$$

D. None of the above

Answer: C

View Text Solution

29. The range of the function $f(x)=\log_e\left(3x^2+4\right)$ is equal to

A. $[\log_e 2, \infty)$

B. $[\log_e 3, \infty)$

C. $[2\log_e 2, \infty)$

D. $[0, \infty)$

Answer: C

Watch Video Solution

30. The relation R defined on the set of natural number as {(a,b)):a differs from b by 3} is given by

A. {(1,4),(2,5),(3,6).....}

B. {(4,1),(5,2),(6,3)}.....}

C. {(1,3,(2,6),(3,9).....}

D. None of the above

Answer: B

Watch Video Solution

31. The differntial equation of all straight line passing through origin is

A. $y = \sqrt{x}\frac{dy}{dx}$

B. $\frac{dy}{dx} = \frac{y}{x}$

C. $\frac{dy}{dx} = y - x$

D. None of the above

Answer: B

Watch Video Solution

32. The value of the integral $\int_1^{3^{1/n}} \frac{dx}{x^n+1} is$

A. $\frac{1}{n}\log\left(\frac{2}{3}\right)$

B. $n\log\left(\frac{2}{3}\right)$

C. $\frac{1}{n}\log\left(\frac{3}{2}\right)$

D. $n\log\left(\frac{3}{2}\right)$

Answer: C

View Text Solution

33. The maximum value of $x^{1/x}$ is

A. $\frac{1}{e^e}$

B. ellipse

C. $e^{1/e}$

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

Answer: C

Watch Video Solution

34. If $P(A \cup B) = 0.8$ and $P(A \cap B) = 0.3$, then P(A')+P(B') equals

A. 0.3

B. 0.5

C. 0.7

D. 0.9

Answer: B

Watch Video Solution

35. $[b \times c \quad c \times a \quad a \times b]$ is equal to

A. [a b c]

B. 2[a b c]

C. $[abc]^2$

D. $a \times (b \times c)$

Answer: C

Watch Video Solution

36. let P be the point $(1, 0)$ and Q be a point on the locus $y^2 = 8x$. The locus of the midpoint of PQ is

A. $x^2 - 4y + 2 = 0$

B. $x^2 + 4y + 2 = 0$

C. $y^2 + 4x + 2 = 0$

D. $y^2 - 4x + 2 = 0$

Answer: D

Watch Video Solution

37. The equation of the hyperbola whose vertics are at (5,0) and (-5,0) and one of the directrices is $x = \frac{25}{7}$ is

A. $\frac{x^2}{25} - \frac{y^2}{24} = 1$

B. $\frac{x^2}{24} - \frac{y^2}{25} = 1$

C. $\frac{x^2}{16} - \frac{y^2}{25} = 1$

D. $\frac{x^2}{25} - \frac{y^2}{16} = 1$

Answer: A

Watch Video Solution

38. The value of $\lim_{x \to 0} \left(\frac{e^x - 1}{x} \right)$ is

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

B. ∞

C. 1

D. 0

Answer: C

Watch Video Solution

39. $\int \frac{x + \sin x}{1 + \cos x}$ is equal to

A. $x\frac{\tan(x)}{2} + c$

B. $x\frac{\sin^2(x)}{2} + c$

C. $\frac{\log\cos(x)}{2} + c$

D. None of the above

Answer: A

Watch Video Solution

40. The general solution of $\frac{dy}{dx} = \frac{2x - y}{x + 2y}$ is

A. $x^2 - xy + y^2 = c$

B. $x^2 - xy - y^2 = 0$

C. $x^2 + xy - y^2 = 0$

D. $x^2 + xy^2 = c$

Answer: B

Watch Video Solution

Watch Video Solution

41. In a Boolean Algebra B, for all x in B, x+x is equal to

A. 0

B. 1

C. x

D. None of the above

Answer: C

Watch Video Solution

42. The equation of the tangents to the ellipse $4x^2 + 3y^2 = 5$, which are parallel to the line y=3x+7 are

A. $Y = 3x \pm \sqrt{\frac{155}{3}}$

B. $Y = 3x \pm \sqrt{\frac{155}{12}}$

C. $Y = 3x \pm \sqrt{\frac{95}{12}}$

D. None of the above

Answer: B

Watch Video Solution

43. If $A = \begin{bmatrix} \alpha & 0 \\ 1 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 \\ 5 & 1 \end{bmatrix}$, then te value of α for which $A^2 = B$, is

A. 1

B. -1

C. 4

D. No real values

Answer: D

Watch Video Solution

44. If $\vec{a}$ is a non zero vecrtor iof modulus $\vec{a}$ and m is a non zero scalar such that ma is a unit vector, write the value of m.

A. $m = \pm 1$

B. $m = |a|$

C. $m = \frac{1}{|a|}$

D. $m = \pm 2$

Answer: C

Watch Video Solution

45. If the constraints in linear programming problem are changed

A. the problem is to be revaluated

B. solution is not defined

C. the objective function has to be modified

D. the change in constraints is ignored

Answer: A

Watch Video Solution

46. $\lim_{n \to \infty} (3^n + 4^n)^{1/n}$ is equal to

A. 3

B. 4

C. ∞

D. e

Answer: B

Watch Video Solution

47. $\frac{d^2x}{dy^2}$ is equal to :

A. $\frac{1}{\left(\frac{dy}{dx}\right)^2}$

B. $\frac{\left(\frac{d^2y}{dx^2}\right)}{\left(\frac{dy}{dx}\right)^2}$

C. $\frac{d^2y}{dx^2}$

D. $\frac{\left(\frac{-d^2y}{dx^2}\right)}{\left(\frac{dy}{dx}\right)^2}$

Answer: D

Watch Video Solution

48. $\int\left(\frac{x+2}{x+4}\right)^2 e^x dx$ is equal to

A. $e^x\left(\frac{x}{x+4}\right)+c$

B. $e^x\left(\frac{x+2}{x+4}\right)+c$

C. $e^x\left(\frac{x-2}{x+4}\right)+c$

D. $\left(\frac{2xe^x}{x+4}\right)+c$

Answer: A

Watch Video Solution

49. Solution of the differential equation $\frac{dx}{x}+\frac{dy}{y}=0$ is

A. xy=c

B. x+y=c

C. log x log y=c

D. $x^2 + y^2 = c$

Answer: A

Watch Video Solution

50. If $\begin{bmatrix} x+y & 2x+z \\ x-y & 2z+w \end{bmatrix} = \begin{bmatrix} 4 & 7 \\ 0 & 10 \end{bmatrix}$ then the values of x, y, z, w are

A. 2,2,3,4

B. 2,3,1,2

C. 3,3,0,1

D. None of the above

Answer: A

Watch Video Solution