



MATHS

BOOKS - MHTCET PREVIOUS YEAR PAPERS AND PRACTICE PAPERS

PRACTICE SET 22

Mathematics

1. The point $(5, -7)$ lies outside the circle

A. $x^2 + y^2 - 8x = 0$

B. $x^2 + y^2 - 5x + 7y = 0$

C. $x^2 + y^2 - 5x + 7y - 1 = 0$

D. $x^2 + Y^2 - 8x + 7y - 2 = 0$

Answer: A

[Watch Video Solution](#)

2. If $x = \frac{1 - t^2}{1 + t^2}$ and $y = \frac{2t}{1 + t^2}$, then $\frac{dy}{dx}$ is equal to

A. $-\frac{y}{x}$

B. $\frac{y}{x}$

C. $-\frac{x}{y}$

D. $\frac{x}{y}$

Answer: C

[Watch Video Solution](#)

3. A vector perpendicular to both of the vectors

$\hat{i} + \hat{j} + \hat{k}$ and $\hat{i} + \hat{j}$ is

A. $\hat{i} + \hat{j}$

B. $\hat{i} - \hat{j}$

C. $c(\hat{i} - \hat{j})$, c is scalar

D. None of these

Answer: C



Watch Video Solution

4. In an ellipse length of minor axis is 8 and eccentricity is $\frac{\sqrt{5}}{3}$. The length of major axis is

A. 6

B. 12

C. 10

D. 16

Answer: B



Watch Video Solution

5. The integrating factor of the differential equation

$$(1 - x^2) \frac{dy}{dx} - xy = 1, \text{ is}$$

A. $-x$

B. $-\frac{x}{(1 - x^2)}$

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

D. $\frac{1}{2} \log(1 - x^2)$

Answer: C



Watch Video Solution

6. The inverse of the statement $(p \wedge \sim q) \rightarrow r$ is

A. $\sim r \Rightarrow \sim p \vee \sim q$

B. $\sim p \vee q \Rightarrow \sim r$

C. $r \Rightarrow p \wedge \sim q$

D. None of these

Answer: B



Watch Video Solution

7. For the matrix $A = \begin{bmatrix} 1 & 1 & 0 \\ 1 & 2 & 1 \\ 2 & 1 & 0 \end{bmatrix}$, which of the following is correct ?

A. $A^3 + 3A^2 - I = O$

B. $A^3 - 3A^2 - I = O$

C. $A^3 + 2A^2 - I = O$

D. $A^3 - A^2 + I = O$

Answer: B



Watch Video Solution

8. One of the diameter of the circle

$x^2 + y^2 - 2x + 4y - 4 = 0$, is

A. $x - y - 3 = 0$

B. $x + y - 3 = 0$

C. $-x + y - 3 = 0$

D. $x + y + 3 = 0$

Answer: A



Watch Video Solution

9. The angle between the straight lines

$$\frac{x+1}{2} = \frac{y-2}{5} = \frac{z+3}{4}$$

and $\frac{x-1}{1} = \frac{y+2}{2} = \frac{z-3}{-3}$ is

A. 45°

B. 30°

C. 60°

D. 90°

Answer: D



Watch Video Solution

10. Minimize $z = \sum_{j=1}^n \sum_{i=1}^m C_{ij} X_{ij}$ subject to $\sum_{j=1}^n X_{ij} \leq a_i, \quad i = 1, 2, \dots, m$ and $\sum_{i=1}^m X_{ij} = b_j, \quad j = 1, 2, \dots, n$ is a LPP with number of constraints

A. $m+n$

B. $m-n$

C. mn

D. $\frac{m}{n}$

Answer: A



Watch Video Solution

11. For the function $f(x) = \frac{\log_e(1+x) + \log_e(1-x)}{x}$ to be continuous at $x = 0$, the value of $f(0)$ is

A. -1

B. 0

C. -2

D. 2

Answer: D



Watch Video Solution

12. The rate of change of surface area of a sphere of radius r when the radius is increasing at the rate of 2 cm/sec is proportional to

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

B. $\frac{1}{r^2}$

C. r

D. r^2

Answer: C



Watch Video Solution

13. If $y = \sqrt{x + \sqrt{x + \sqrt{x + \dots \rightarrow \infty}}}$, then $\frac{dy}{dx}$ is equal to.....

A. $\frac{x}{2y - 1}$

B. $\frac{2}{2y - 1}$

C. $-\frac{1}{2y - 1}$

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

Answer: D



Watch Video Solution

14. $\int_0^{2\pi} (\sin x - |\sin x|) dx$ equal to

A. 0

B. 4

C. 8

D. 1

Answer: B



Watch Video Solution

15. The solution of the differential equation

$(\sin x + \cos x)dy + (\cos x - \sin x)dx = 0$ is-

A. $e^x(\sin x + \cos x) + c = 0$

B. $e^y(\sin x + \cos x) = c$

C. $e^y(\cos x - \sin x) = c$

D. $e^x(\sin x - \cos x + x) = c$

Answer: B

16. Locus of the point of intersection of perpendicular tangents to the circle $x^2 + y^2 = 16$ is

A. $x^2 + y^2 = 8$

B. $x^2 + y^2 = 32$

C. $x^2 + y^2 = 64$

D. $x^2 + y^2 = 16$

Answer: B

17. In a Boolean Algebra B, for all x in B, $x+1$ is equal to

A. 0

B. 1

C. x

D. None of these

Answer: B



Watch Video Solution

18. A normal is drawn at a point $P(x, y)$ of a curve. It meets the x -axis at Q . If PQ is of constant length k , such a curve passing through $(0, k)$ is

A. $y \frac{dy}{dx} = - + \sqrt{k^2 - y^2}$

B. $x \frac{dy}{dx} = - + \sqrt{k^2 - x^2}$

C. $y \frac{dy}{dx} = - + \sqrt{y^2 - k^2}$

D. $x \frac{dy}{dx} = - + \sqrt{x^2 - k^2}$

Answer: A



Watch Video Solution

19. The total area enclosed by the lines $y = |x|$, $y = 0$ and $|x| = 1$ is

- A. 2 sq unit
- B. 4 sq unit
- C. 1 sq unit
- D. None of these

Answer: C



Watch Video Solution

20. $\int \sqrt{\frac{x}{a^3 - x^3}} dx$ is equal to

- A. $\frac{2}{3} \cos^{-1} \left(\frac{x^2/3}{a^2/3} \right) + c$
- B. $\frac{2}{3} \sin^{-1} \left(\frac{x^2/3}{a^2/3} \right) + c$
- C. $\frac{2}{3} \tan^{-1} \left(\frac{x^2/3}{a^2/3} \right) + c$
- D. $\frac{2}{3} \sin^{-1} \left(\frac{x^2/3}{a^2/3} \right) + c$

Answer: D



Watch Video Solution

21. If $f(x) = |\cos x|$, then $f' \left(\frac{3\pi}{4} \right)$ equal to -

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

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

C. 1

D. None of these

Answer: B



Watch Video Solution

22. These is an objective type question with 4 answer choices exactly one of which is correct. A student has not studied the topic on which the

question has been set. The probability that the student guesses the correct answer is

A. $1/2$

B. $1/4$

C. $1/8$

D. None of these

Answer: B



Watch Video Solution

23. $\int \frac{\cos 2x - 1}{\cos 2x + 1} dx$ is equal to

A. $\tan x - x + c$

B. $-x - \tan x + c$

C. $x - \tan x + c$

D. $-x - \cot x + c$

Answer: C



Watch Video Solution

24. The equation of the parabola with its vertex at $(1, 1)$ and focus at $(3, 1)$ is

A. $(x - 1)^2 = 8(y - 1)$

B. $(y - 1)^2 = 8(x - 3)$

C. $(y - 1)^2 = 8(x - 1)$

D. $(x - 3)^2 = 8(y - 1)$

Answer: C



Watch Video Solution

25. What is the value of $(d + a) \cdot [a \times \{b \times (c \times d)\}]$?

A. (d.a)[b c d]

B. (a.d)[b c d]

C. (b.d) [a c d]

D. (b.d)[a d c]

Answer: C



Watch Video Solution

26. Let T_r be the r^{th} term of an A.P whose first term is a and common difference is d IF for some integer m, n , $T_m = \frac{1}{n}$ and $T_n = \frac{1}{m}$ then $a - d =$

A. 0

B. 1

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

D. $\frac{1}{m} + \frac{1}{n}$

Answer: A



Watch Video Solution

27. Let $X = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$, $A = \begin{bmatrix} 1 & -1 & 2 \\ 2 & 0 & 1 \\ 3 & 2 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 3 \\ 1 \\ 4 \end{bmatrix}$. If $AX=B$, then X is equal to

A. $\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$

B. $\begin{bmatrix} -1 \\ -2 \\ 3 \end{bmatrix}$

C. $\begin{bmatrix} -1 \\ -2 \\ -3 \end{bmatrix}$

D. $\begin{bmatrix} -1 \\ 2 \\ 3 \end{bmatrix}$

Answer: D



Watch Video Solution

28. Which of the following is a statement ?

- A. Open the door
- B. Do your home work
- C. Two plus two is four
- D. Switch on the fan

Answer: C



Watch Video Solution

29. A line passes through the point $(2, 2)$ and is perpendicular to the line $3x + y = 3$, then its y -intercept is

- A. $1/3$
- B. $2/3$
- C. 1
- D. $4/3$

Answer: D



Watch Video Solution

30. The angle of intersection between the curves $x^2 = 4(y + 1)$ and $x^2 = -4(y + 1)$ is

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

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

C. 0

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

Answer: C



Watch Video Solution

31. If the sum of first n natural numbers is $\frac{1}{78}$ times the sum of their cubes, then the value of n is

A. 11

B. 12

C. 13

D. 14

Answer: B



Watch Video Solution

32. The locus of the foot of the perpendicular from the foci an any tangent to the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, is

A. $l = a^2, m = b^2$

B. $l = b^2, m = a^2$

C. $l=m=a$

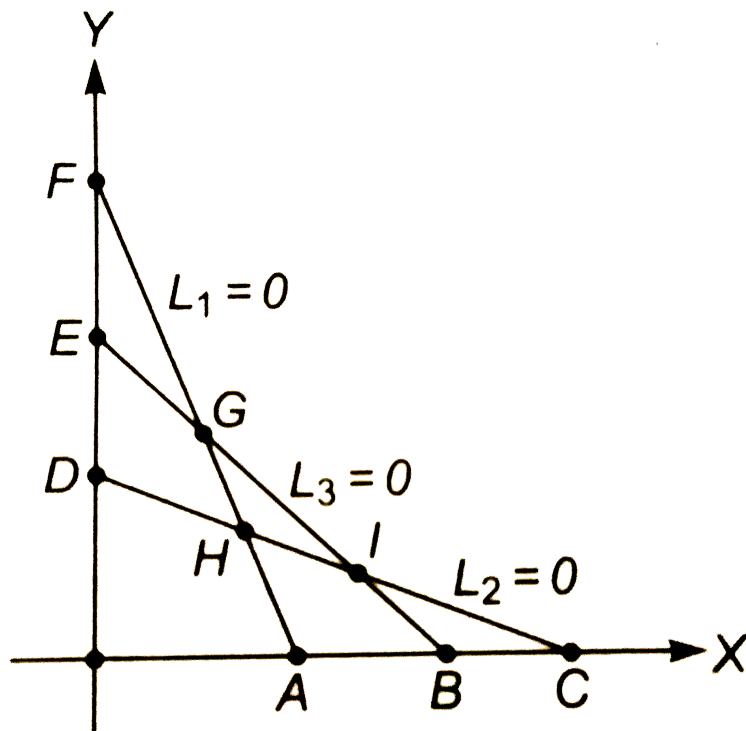
D. $l=m=b$

Answer: A



33. The feasible for the following constraints

$L_1 \leq 0, L_2 \geq 0, L_3 = 0, x \geq 0, y \geq 0$ in the diagram shown is



A. area DHF

B. area AHC

C. line segment EG

D. line segment GI

Answer: C



Watch Video Solution

34. The value of $\lim_{x \rightarrow 1} \frac{x^7 - 2x^5 + 1}{x^3 - 3x^2 + 2}$ is

A. 0

B. 1

C. -1

D. None of these

Answer: B



Watch Video Solution

35. For the function $y = x + \frac{1}{x}$

- A. $x=1$ is a point of maximum
- B. $x = -1$ is a point of minimum
- C. maximum value $>$ minimum value
- D. maximum value $<$ minimum value

Answer: D



Watch Video Solution

36. The derivative of $f(x) = \int_{x^2}^{x^3} \frac{1}{\log_e(t)} dt$, ($x > 0$), is

- A. $\frac{1}{3 \log x}$
- B. $\frac{1}{3 \log x} - \frac{1}{2 \log x}$
- C. $(\log x)^{-1} x(x - 1)$
- D. $\frac{3x^2}{\log x}$

Answer: C



Watch Video Solution

37. In a certain town, 25 % families own a cell phone, 15 % families own a scooter and 65 % families own both a cell phone and a scooter, then the total number of families in the town is

A. 10000

B. 20000

C. 30000

D. 40000

Answer: C



View Text Solution

38. If $A = \{1, 2, 3, 4, 5\}$, then find the domain in the relation from A to A by $R = \{(x, y) : y = 2x - 1\}$.

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

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

C. $\{1,3,5\}$

D. $\{2,4\}$

Answer: A



Watch Video Solution

39. If $x^y = e^{x-y}$, then $\frac{dy}{dx}$ is equal to

A. $\frac{1}{1 + \log x}$

B. $\frac{\log x}{(1 + \log x)^2}$

C. $\frac{x}{(1 + \log x)^2}$

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

Answer: B



Watch Video Solution

40. In Boolean Algebra, the unit element '1'

- A. has two vectors
- B. is unique
- C. has at least two values
- D. None of the above

Answer: B



Watch Video Solution

41. If $A = \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$, then A^{100} is equal to

- A. 2^{100}
- B. $2^{99} A$
- C. $100 A$
- D. $299 A$

Answer: B



Watch Video Solution

42. The value of the integral $\int \frac{1+x^2}{1+x^4} dx$ is equal to

- A. $\frac{1}{\sqrt{2}} \tan^{-1} \left(\frac{x^2}{\sqrt{2}} \right) + c$
- B. $\frac{1}{\sqrt{2}} \tan^{-1} \left(\frac{x^2 - 1}{\sqrt{2}x} \right) + c$
- C. $\frac{1}{\sqrt{2}} \tan^{-1} \left(\frac{x^2 + 1}{x} \right) + c$
- D. $\tan^{-1} \left(\frac{x^2 - 1}{\sqrt{2}x} \right) + c$

Answer: B



Watch Video Solution

43. The minimum value of $2^{x^2-3} \wedge (3+27)$ is 2^{27} (b) 2 (c) 1 (d) none of these

A. 1

B. 2

C. 2^{27}

D. None of these

Answer: A



Watch Video Solution

44. If $f(2)=2$ and $f'(2)=1$, and then $\lim_{x \rightarrow 2} \frac{2x^2 - 4f(x)}{x - 2}$ is equal to

A. 4

B. -4

C. 2

D. -2

Answer: A



Watch Video Solution

45. The probability that a man will live 10 more years is $\frac{1}{4}$ and the probability that his wife will live 10 more years is $\frac{1}{3}$. Then the probability that neither will be alive in 10 years, is

A. $\frac{5}{12}$

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

C. $\frac{7}{12}$

D. $\frac{11}{12}$

Answer: B



Watch Video Solution

46. If $A = \{x, y, z\}$ and $B = \{a, b, c, d\}$. Then, which one of the following is not a relation from A to B ?

A. $\{(x,a), (x,c)\}$

B. $\{(y,c), (y,d)\}$

C. $\{(z,a), (z,d)\}$

D. $\{(z,b), (y,b), (a,d)\}$

Answer: D



Watch Video Solution

47.

$$\left[\left(\vec{a} \times \vec{b} \right) \times \left(\vec{b} \times \vec{c} \right) \quad \left(\vec{b} \times \vec{c} \right) \times \left(\vec{c} \times \vec{a} \right) \quad \left(\vec{c} \times \vec{a} \right) \times \left(\vec{a} \times \vec{b} \right) \right]$$

equal to

A. $[abc]^2$

B. $[abc]^3$

C. $[abc]^4$

D. None of these

Answer: C

[Watch Video Solution](#)

48. Equation of circle whose centre is $(3, -1)$ and which cut off an intercept of length 6 unit from the line : $2x - 5y + 18 = 0$ is:

A. $x^2 + y^2 - 6x + 2y - 18 = 0$

B. $x^2 + y^2 - 6x + 2y - 38 = 0$

C. $x^2 + y^2 - 6x + 2y - 28 = 0$

D. None of the above

Answer: C

[Watch Video Solution](#)

49. If $\begin{bmatrix} 1 & 1 & 1 \\ 1 & -2 & -2 \\ 1 & 3 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 0 \\ 3 \\ 4 \end{bmatrix}$, then $\begin{bmatrix} x \\ y \\ z \end{bmatrix}$ is equal to

A. $\begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix}$

- B. $\begin{bmatrix} 1 \\ 2 \\ -3 \end{bmatrix}$
- C. $\begin{bmatrix} 5 \\ -2 \\ 1 \end{bmatrix}$
- D. $\begin{bmatrix} 1 \\ -2 \\ 3 \end{bmatrix}$

Answer: B



Watch Video Solution

50. The three straight lines $ax+by=c$, $bx+cy=a$ and $cx+ay=b$ are collinear, if

- A. $b+c=a$
- B. $c+a=b$
- C. $a+b+c=0$
- D. $a+b=c$

Answer: C



Watch Video Solution

