MATHS

BOOKS - MHTCET PREVIOUS YEAR PAPERS AND PRACTICE PAPERS

PRACTICE SET 16

Paper 2 Mathematics

1. If A = {x , y}, then the power set of A is

A. $\{x^y, y^x\}$

B. $\{\phi, x, y\}$

C. $\{\phi, \{x\}, \{2y\}\}$

D. $\{\phi, \{x\}, \{y\}, \{x, y\}\}$

Answer: D

Watch Video Solution

2. If R is a relation defined as aRb, $\text{iff}|a-b|>0$, then the relation is

A. reflexive

B. symmetric

C. transitive

D. symmetric and transitive

Answer: D

Watch Video Solution

3. The point diametrically opposite to the point P(1, 0) on the circle $x^2+y^2+2x+4y-3=0$ is

A. $(3, 4)$

B. $(3, -4)$

C. $(-3, 4)$

D. $(-3, -4)$

Answer: D

Watch Video Solution

4. The centre of the circle whose radius is 5 and which touches the circle $x^2 + y^2 - 2x - 4y - 20 = 0$ at $(5, 5)$ is

A. $(10, 5)$

B. $(5, 8)$

C. $(5, 10)$

D. $(9, 8)$

Answer: D

Watch Video Solution

5. The equation $y^2 - 8y - x + 19 = 0$ represents

A. a parabola whose focus is $\left(\frac{1}{4}, 0\right)$ and directrix is $x = \frac{-1}{4}$

B. a parabola whose vertex is $(3, 4)$ and directrix is $x = \frac{11}{4}$

C. a parabola whose focus is $\left(\frac{13}{4}, 4\right)$ and vertex is $(0, 0)$

D. a curve which is not a parabola

Answer: B

Watch Video Solution

6. The integrating factor of the differential equation $\frac{dy}{dx} + \frac{y}{(1-x)\sqrt{x}} = 1 - \sqrt{x}$, is

A. $\frac{1-\sqrt{x}}{1+\sqrt{x}}$

B. $\frac{1+\sqrt{x}}{1-\sqrt{x}}$

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

D. $\frac{\sqrt{x}}{1-\sqrt{x}}$

Answer: B

Watch Video Solution

7. Number of solutions of $y = e^x$ and $y = \sin x$ is

A. 0

B. 1

C. 2

D. infinite

Answer: D

Watch Video Solution

8. The angles A, B and C of a ΔABC are in AP. If $b : c = \sqrt{3} : \sqrt{2}$, then $\angle A$ is equal to

A. 30°

B. 15°

C. 75°

D. 45°

Answer: C

Watch Video Solution

9. If $\sin^{-1}\left(\frac{3}{x}\right) + \sin^{-1}\left(\frac{4}{x}\right) = \frac{\pi}{2}$, then x is equal to

A. 3

B. 5

C. 7

D. 11

Answer: B

Watch Video Solution

10. The probility that the same number appear on throwing three dice simultaneously is

A. $\frac{1}{36}$

B. $\frac{5}{36}$

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

D. $\frac{4}{13}$

Answer: A

Watch Video Solution

11. The value of $\int_1^4 |x-3|dx$ is equal to

A. 2

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

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

D. $\frac{3}{2}$

Answer: B

Watch Video Solution

12. *Let* $f(x) = \frac{1 - \tan x}{4x - \pi}, x \neq \frac{\pi}{4}, x \in \left[0, \frac{\pi}{2}\right]$, If $f(x) is$ continuous in $\left[0, \frac{\pi}{4}\right]$, then find the value of $f\left(\frac{\pi}{4}\right)$.

A. 1

B. $1/2$

C. $-1/2$

D. -1

Answer: C

Watch Video Solution

13. Let the line $\frac{x-2}{3}=\frac{y-1}{-5}=\frac{z+2}{2}$ lies in the plane $x+3y-\alpha z+\beta=0$. Then, (α, β) equals

A. $(6, -17)$

B. $(-6, 7)$

C. $(5, -15)$

D. $(-5, 15)$

Answer: B

Watch Video Solution

14. A line line makes the same angle θ with each of the x and z-axes. If the angle β, which it makes with y-axis, is such that $\sin^2\beta=3\sin^2\theta$ then $\cos^2\theta$ equals

A. $2/3$

B. $1/5$

C. $3/5$

D. $2/5$

Answer: C

Watch Video Solution

15. The value of $\int \frac{x^2+1}{x^2-1} dx$ is

A. $\log\left(\frac{x-1}{x+1}\right) + c$

B. $\log\left(\frac{x+1}{x-1}\right) + c$

C. $x + \log\left(\frac{x-1}{x+1}\right) + c$

D. $\log\left(x^2-1\right) + c$

Answer: C

Watch Video Solution

16. If $a = 2\sqrt{2}, b = 6, A = 45^\circ$, then

A. no triangle is possible

B. one triangle is possible

C. two triangles are possible

D. Either no triangle or two triangles are possible

Answer: A

Watch Video Solution

17. If $y = (1+x)\left(1+x^2\right)\left(1+x^4\right)\left(1+x^{2n}\right)$, then find $\frac{dy}{dx} atx = 0.$

A. 0

B. -1

C. 1

D. 2

Answer: C

Watch Video Solution

18. $\int \frac{dx}{\sin(x-a)\sin(x-b)}$ is

A. $\frac{1}{\sin(a-b)}\log\left|\frac{\sin(x-a)}{\sin(x-b)}\right|+c$

B. $\frac{-1}{\sin(a-b)}\log\left|\frac{\sin(x-a)}{\sin(x-b)}\right|+c$

C. $\log\sin(x-a)\sin(x-b)+c$

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

Answer: A

Watch Video Solution

19. In ΔABC $2a^2+4b^2+c^2=2ab+2ac$ then numerical value of $\cos B$ is

A. 0

B. $\frac{1}{8}$

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

D. $\frac{7}{8}$

Answer: D

Watch Video Solution

20. The solution of the differential equation $\left(e^{-2\sqrt{x}} - \frac{y}{\sqrt{x}}\right)\frac{dx}{dy} = 1$ is given by

A. $ye^{2\sqrt{x}} = x + c$

B. $ye^{-2\sqrt{x}} = \sqrt{x} + c$

C. $y = \sqrt{x}$

D. $y = 3\sqrt{x}$

Answer: A

Watch Video Solution

21. Let $f:(0,\infty)\to R$ and $F(x)=\int_0^x f(t)dt$. If $F(x^2)=x^2(1+x)$, then f(4) equals

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

B. 7

C. 4

D. 2

Answer: C

Watch Video Solution

22. $\lim_{n\to\infty}\frac{1}{n}+\frac{1}{\sqrt{n^2+n}}+\frac{1}{\sqrt{n^2+2n}}+\ldots\frac{1}{\sqrt{n^2+(n-1)n}}$ is equal to

A. $2 + 2\sqrt{2}$

B. $2\sqrt{2} - 2$

C. $2\sqrt{2}$

D. 2

Answer: B

Watch Video Solution

23. The area bounded by $y = \sin^{-1} x, x = \frac{1}{\sqrt{2}}$ and X-axis is

A. $\left(\frac{1}{\sqrt{2}} + 1\right)$ sq unit

B. $\left(1 - \frac{1}{\sqrt{2}}\right)$ sq unit

C. $\frac{\pi}{4\sqrt{2}}$ sq unit

D. $\left(\frac{\pi}{4\sqrt{2}} + \left\{\frac{1}{\sqrt{2}} - 1\right\}\right)$ sq unit

Answer: D

Watch Video Solution

Watch Video Solution

24. The perpendicular distance between the line $\vec{r} = 2\hat{i} - 2\hat{j} + 3\hat{k} + \lambda\left(\hat{i} - \hat{j} + 4\hat{k}\right)$ and the plane $\vec{r}.\left(\hat{i}\middle|5\hat{j}\middle|\hat{k}\right) = 5$ is :

A. $\frac{10}{3}$

B. $\frac{3}{10}$

C. $\frac{10}{3\sqrt{3}}$

D. $\frac{10}{9}$

Answer: C

Watch Video Solution

25. If the slope of one of the lines given by $ax^2 + 2hxy + by^2 = 0$ is 5 times the other, then

A. $5h^2 = 9ab$

B. $5h^2 = ab$

C. $h^2 = ab$

D. $9h^2 = 5ab$

Answer: A

Watch Video Solution

26. The derivative of $f(x) = 3|2 + x|$ at the point $x_0 = -3$ is

A. 3

B. -3

C. 0

D. does not exist

Answer: B

Watch Video Solution

27. The curve given by $x + y = e^{xy}$ has a tangent parallel to the y-axis at the point

A. $(1, 0)$

B. At no point

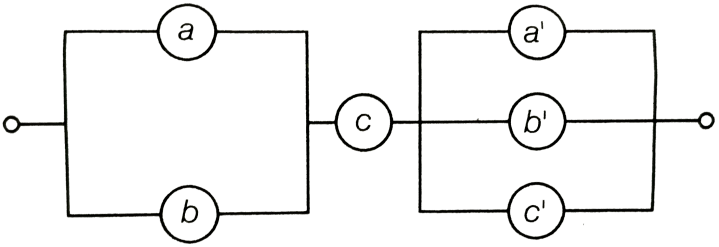
C. $(0, 1)$

D. $(0, 0)$

Answer: A

Watch Video Solution

28. Switching function of the network is



A. $(a \wedge b) \vee c \vee (a' \wedge b' \wedge c')$

B. $(a \wedge b) \wedge c \wedge (a' \wedge b' \wedge c')$

C. $(a \vee b) \wedge c \wedge (a' \vee b' \vee c')$

D. None of the above

Answer: C

Watch Video Solution

29. Let p be the proposition that Mathematics is interesting and q be the proposition that Mathematics is difficult, then the symbol $p \wedge q$ means

A. Mathematics is interesting implies that Mathematics is difficult

B. Mathematics is interesting implies and is implied by mathematics is difficult

C. Mathematics is interesting and Mathematics is difficult

D. Mathematics is interesting or Mathematics is difficult

Answer: C

Watch Video Solution

30. The equation to a pair of opposite sides of a parallelogram are $x^2 - 5x + 6 = 0$ and $y^2 + 5 = 0$. The equations to its diagonals are

$x + 4y = 13, y = 4x - 7$ (b) $4x + y = 13, 4y = x - 7$

$4x + y = 13, y = 4x - 7$ (d) $y - 4x = 13, y + 4x - 7$

A. $x + 4y = 13$ and $y = 4x - 7$

B. $4x + y = 13$ and $4y = x - 7$

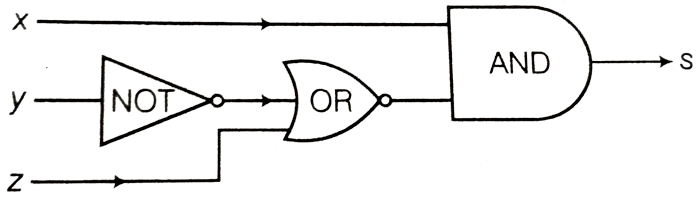
C. $4x + y = 13$ and $y = 4x - y$

D. $y - 4x = 13$ and $y + 4x = 7$

Answer: C

Watch Video Solution

31. In the adjoining circuit, the output s is



A. $x \cdot (y' + z)$

B. $x \cdot (y' + z')$

C. $x \cdot (y + z)$

D. $(x + y) \cdot z$

Answer: A

Watch Video Solution

32. The slope of tangent at (x,y) to a curve passing through (2, 1) is $\frac{x^2 + y^2}{2xy}$, then the equation of the curve is

A. $2(x^2 - y^2) = 3x$

B. $2\left(x^2-y^2\right)=6y$

C. $x\left(x^2-y^2\right)=6$

D. $x\left(x^2+y^2\right)=10$

Answer: A

Watch Video Solution

33. The value of the integral $\int_3^6 \frac{\sqrt{x}}{\sqrt{9-x}+\sqrt{x}}dx$ is

A. $3/2$

B. 2

C. 3

D. 6

Answer: A

Watch Video Solution

34. Find the probability that a leap year will have 53 Friday or 53 Saturdays.

A. $\frac{2}{7}$

B. $\frac{3}{7}$

C. $\frac{4}{7}$

D. $\frac{1}{7}$

Answer: B

Watch Video Solution

35. The function $f(x) = \frac{x}{2} + \frac{2}{x}$ has a local minimum at $x = 2$ (b) $x = -2$ $x = 0$ (d) $x = 1$

A. x = - 2

B. x = 0

C. x = 1

D. x = 2

Answer: D

Watch Video Solution

36. Two person A and B take turns in throwing a pair of dice. The first person to through 9 from both dice will win the game. If A throwns fisrt then the probability that B wins the game is.

A. $\frac{9}{17}$

B. $\frac{8}{17}$

C. $\frac{8}{9}$

D. $\frac{1}{9}$

Answer: B

Watch Video Solution

37. The dr. of normal to the plane through $(1, 0, 0), (0, 1, 0)$ which makes an angle $\frac{\pi}{4}$ with plane , $x + y = 3$ are

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

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

C. $1, 1, 2$

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

Answer: B

Watch Video Solution

38. If twice the 11th term of an AP is equal to 7 times its 21st term, then its 25th term is equal to

A. 24

B. 120

C. 0

D. None of these

Answer: D

Watch Video Solution

39. if a G.P (p+q)th term = m and (p-q) th term = n , then find its p th term

A. $(mn)^{1/2}$

B. mn

C. $m+n$

D. $m-n$

Answer: A

Watch Video Solution

40. If

$x = 2 + a + a^2 + \infty, where|a| < 1 and y = 1 + b + b^2 + \infty, where|b| < 1$

prove that: $1 + ab + a^2b^2 + \infty = \frac{xy}{x + y - 1}$

A. $\frac{xy}{y + x - 1}$

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

C. $\frac{x^2 + y^2}{x - y}$

D. None of these

Answer: A

Watch Video Solution

41. 26, The distance between the lines 3x + 4y = 9 and 6x + 8y + 15-0 is 3 10

10 (d) none of these

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

B. $\frac{3}{10}$

C. 6

D. None of these

Answer: B

Watch Video Solution

42. The image of the origin with reference to the line 4x+3y -25=0 is

A. (-8, 6)

B. (8, 6)

C. (-3, 4)

D. (8, -6)

Answer: B

Watch Video Solution

43. If $g(x) = \min\left(x, x^2\right)$, where x is a real number, then

A. g(x) is an increasing function

B. g(x) is a decreasing function

C. g(x) is a constant function

D. g(x) is a continuous function except at x = 0

Answer: A

Watch Video Solution

44. If $\sin 3\theta = \sin\theta$, how many solutions exist such that $-2\pi < \theta < 2\pi$

A. 8

B. 9

C. 5

D. 7

Answer: C

Watch Video Solution

45. If the mean and variance of a random variable X having a binomial distribution of 8 terms, are 4 and 2, respectively. Then $P(X > 6)$ is equal to

A. $\frac{1}{256}$

B. $\frac{3}{256}$

C. $\frac{9}{256}$

D. $\frac{7}{256}$

Answer: C

Watch Video Solution

46. If the area bounded by the curve $y = \sin ax, y = 0, x = \pi/a$ and $x = \pi/3a(a > 0)$, is 3 then a is equal to

A. $1/2$

B. 2

C. $\left(2 + \sqrt{3}\right)/3$

D. None of these

Answer: A

Watch Video Solution

47. The shortest distance between the lines $\frac{x-2}{3} = \frac{y+3}{4} = \frac{z-1}{5}$ and $\frac{x-5}{1} = \frac{y-1}{2} = \frac{z-6}{3}$, is

A. 3

B. 2

C. 1

D. 0

Answer: D

Watch Video Solution

48. $\int e^{x \log a} e^x dx$ is equal to

A. $\frac{a^x}{\log ae} + c$

B. $\frac{e^x}{1 + \log_e a} + c$

C. $(ae)^x + c$

D. $\frac{(ae)^x}{\log_e ae} + c$

Answer: D

Watch Video Solution

49. Find the intervals in which $f(x) = x^3 - 6x^2 - 36x + 2$ is increasing or decreasing.

A. $(6, \infty)$

B. $(-\infty, -2)$

C. $(-2, 6)$

D. None of these

Answer: C

Watch Video Solution

50. A line with positive diection cosines passes through the ont $P(2, -1, 2)$ and makes equal angles with the coordinate axes. The line meets the plane $2x = y + z = 0$ at Q. The length of the line segment PQ equals (A) 1 (B) $\sqrt{2}$ (C) $\sqrt{3}$ (D) 2

A. 1

B. $\sqrt{2}$

C. $\sqrt{3}$

D. 2

Answer: C

Watch Video Solution