MATHS

BOOKS - KCET PREVIOUS YEAR PAPERS

MODEL TEST PAPER 6

Mathematics

1. The angle of intersection of the curves $x^2 + y^2 = 8$ and $x^2 = 2y$ at the point (2, 2) is

A. $\tan^{-1}.\frac{1}{2}$

B. $\tan^{-1}.\frac{1}{3}$

C. $\tan^{-1} 2$

D. $\tan^{-1} 3$

Answer: D

Watch Video Solution

2. A stone is thrown up vertically and the height x feet reached by it in time t seconds is given by $x = 80t - 16t^2$. The stone reaches the maximum height in time (seconds)

A. 2

B. 3

C. 2.5

D. 3.5

Answer: C

Watch Video Solution

3. For all positive values of p, q, r and s

$$\frac{\left(p^2+p+1\right)\left(q^2+q+1\right)\left(r^2+r+1\right)\left(s^2+s+1\right)}{pqrs}$$

cannot be less than

A. 81

B. 101

C. 91

D. 111

Answer: A

Watch Video Solution

4. The maximum value of $y = a\cos x + b\sin x$ is

A. ab

B. $\frac{1}{\sqrt{a^2 + b^2}}$

C. $a^2 + b^2$

D. $\sqrt{a^2 + b^2}$

Answer: D

Watch Video Solution

5. The equation to the tangent to the curve $y = be^{x/a}$ at the point where $x = 0$ is

A. $\frac{x}{a} - \frac{y}{b} = 1$

B. $\frac{x}{a} + \frac{y}{b} = 1$

C. $\frac{y}{b} - \frac{x}{a} = 1$

D. $ax + by = ab$

Answer: C

Watch Video Solution

6. The length of the subnormal to the curve $y^2 = x^3$ at the point (4, 8) is

A. 24

B. $3/8$

C. $8/3$

D. 12

Answer: A

Watch Video Solution

7. The length of the subtangent to the curve $x^2 + y^2 = a^4$ at the point $(-a, a)$ is

A. 3a

B. a

C. 2a

D. 4a

Answer: A

Watch Video Solution

8. If $x^2 + xy + y^2 = 0$, $\frac{d^2y}{dx^2} =$

A. 0

B. $1/2$

C. 1

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

Answer: A

Watch Video Solution

9. If $y = a^x$, $\frac{d^2y}{dx^2} =$

A. $a^x (\log a)^2$

B. $a^x \log a$

C. $a^{2x} (\log a)$

D. None

Answer: A

Watch Video Solution

10. If $y = \sqrt{x + \sqrt{x + \sqrt{x + ...\infty}}}$ $\frac{dy}{dx} =$

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

B. $\frac{1}{x\sqrt{y}}$

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

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

Answer: C

Watch Video Solution

11. If $x^m y^n = (x + y)^{m+n}$, then $\frac{dy}{dx} =$

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

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

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

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

Answer: A

Watch Video Solution

12. $\underset{n \to \infty}{\text{Lt}} \left(1 + \frac{2}{n}\right)^{2n} =$

A. e

B. $\sqrt{e}$

C. e^4

D. $1/e$

Answer: C

Watch Video Solution

13. $\lim_{x \to \infty} \sqrt{x}\left(\sqrt{x+a} - \sqrt{x}\right) =$

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

B. a

C. $-a/2$

D. $-a$

Answer: A

Watch Video Solution

14. The domain of the function

$y = \sqrt{x-2} + \sqrt{1-x}$ is

A. $x \geq 2$

B. null set

C. $x \leq 2$

D. the set of all real numbers

Answer: B

Watch Video Solution

15. If $f(x) = \frac{1}{1-x}$, then $f[f\{x\}] =$

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

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

C. x

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

Answer: C

Watch Video Solution

16. A root of the equation $\begin{vmatrix} 0 & x-a & x-b \\ x+a & 0 & x-c \\ x+b & x+c & 0 \end{vmatrix} = 0$ is

A. a

B. 0

C. b

D. 1

Answer: B

Watch Video Solution

17. $\begin{vmatrix} x & 4 & y+z \\ y & 4 & z+x \\ z & 4 & x+y \end{vmatrix} =$

A. 4

B. xyz

C. $x+y+z$

D. 0

Answer: D

Watch Video Solution

18. $\begin{vmatrix} 11 & 12 & 13 \\ 12 & 13 & 14 \\ 13 & 14 & 15 \end{vmatrix} =$

A. 1

B. -1

C. 0

D. 67

Answer: C

Watch Video Solution

19.

$$\lim_{n \to \infty} \left(\frac{1}{n} + \frac{1}{\sqrt{n^2 - 1}} + \frac{1}{\sqrt{n^2 - 4}} + \ldots \text{to n terms} \right) =$$

A. π

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

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

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

Answer: C

Watch Video Solution

20. The area enclosed between the x-axis and one arch or the curve $y = \sin x$ is

A. 1

B. 2

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

D. π

Answer: C

Watch Video Solution

21. $\int_1^3 (x-1)(x-2)(x-3)dx =$

A. 3

B. 1

C. 2

D. 0

Answer: D

Watch Video Solution

22. $\int_0^{\pi/2} \frac{\sin^{3/2} x}{\sin^{3/2} x + \cos^{3/2} x} dx =$

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

B. π

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

D. 1

Answer: C

Watch Video Solution

Watch Video Solution

23. $\int_{\pi/4}^{\pi/2} \cot x dx =$

A. log 2

B. $\frac{\pi}{2}$ log 2

C. $\log \sqrt{2}$

D. 2 log 2

Answer: C

Watch Video Solution

24. $\int \frac{dx}{x + \sqrt{x}} =$

A. $\log(1+\sqrt{x})$

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

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

D. $\frac{x^2}{2}+\frac{2}{3}x^{3/2}$

Answer: B

Watch Video Solution

25. $\int\frac{x^3+x^2+1}{x+1}dx=$

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

B. $\frac{x^4}{4}+\frac{x^3}{3}+\log(x)$

C. $\frac{x^3}{3}+\log(x+1)$

D. none of these

Answer: C

Watch Video Solution

26. $\int \frac{\sin x}{\sqrt{4-\cos^2 x}} dx =$

A. $\sin^{-1}\left(\frac{\cos x}{2}\right)$

B. $-\frac{1}{2}\sin^{-1}\left(\frac{\cos x}{2}\right)$

C. $\frac{1}{2}\sin^{-1}\left(\frac{\cos x}{2}\right)$

D. $-\sin^{-1}\left(\frac{\cos x}{2}\right)$

Answer: D

Watch Video Solution

Watch Video Solution

27. $\int \frac{\log(x^2)}{x} dx =$

A. $(\log x)^2$

B. $\log(x^2)$

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

D. $2\log(x^2)$

Answer: A

Watch Video Solution

28. $\int \frac{\sin^6 x}{\cos^8 x} dx =$

A. $\frac{\tan^7 x}{7}$

B. $\frac{1}{\cos^7 x}$

C. $\frac{\cot^7 x}{7}$

D. $\frac{7}{\cos^7 x}$

Answer: A

Watch Video Solution

29. $\int \frac{1}{\sin^2 x \cos^2 x} dx =$

A. $-\cot x + \tan x$

B. $\cot x - \tan x$

C. $-\cot x - \tan x$

D. $\cot x + \tan x$

Answer: A

Watch Video Solution

30. Who, along with Newton, shares the honour of inventing calculus?

A. Euler

B. Leibnitz

C. De Moivre

D. Einstein

Answer: B

Watch Video Solution

31. Square matrices of the type $\begin{bmatrix} x & x \\ x & x \end{bmatrix}$ form a group under the usual matrix multiplication. The identity of this group is

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

B. $\begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$

C. $\begin{bmatrix} 1/2 & 1/2 \\ 1/2 & 1/2 \end{bmatrix}$

D. $\begin{bmatrix} 1/3 & 1/3 \\ 1/3 & 1/3 \end{bmatrix}$

Answer: C

Watch Video Solution

32. Define $*$ on the set of real number by $a * b = 1 + ab$. Then the operation $*$ is

A. commutative but not associative

B. neither commutative nor associative

C. associative but not commutative

D. both commutative and associative.

Answer: A

Watch Video Solution

33. In a group $(G, *)$ for some element a of G , $a^2 = e$, where e is the indentity element . Then

A. $a = \sqrt{e}$

B. $a = e$

C. $a = a^{-1}$

D. None of these

Answer: B

Watch Video Solution

34. The set of all integers is not a group under multiplication because

A. closure property fails

B. there is no identity element

C. associative law does not hold

D. there is no inverse

Answer: D

35. The remainder obtained when $64 \times 65 \times 66$ is divided by 67 is

A. 60

B. 62

C. 61

D. 63

Answer: C

Watch Video Solution

36. A value of x satisfying $5x \equiv +3 \pmod 7$ is

A. 6

B. 3

C. 2

D. 4

Answer: C

Watch Video Solution

37. The last digit of the number 11^{132} is

A. 1

B. 4

C. 2

D. 6

Answer: A

Watch Video Solution

38. Which of the following is a prime number?

A. 370261

B. 73271

C. 1003

D. 667

Answer: A

Watch Video Solution

39. The value of K so that $y = 4x + K$ may touch the hyperbola $\frac{x^2}{64} - \frac{y^2}{49} = 1$ is

A. $\sqrt{975}$

B. $\sqrt{775}$

C. $\sqrt{875}$

D. $\sqrt{675}$

Answer: A

Watch Video Solution

40. The eccentricity of the hyperbola $4x^2 - 9y^2 - 8x = 32$ is

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

B. $\frac{\sqrt{13}}{2}$

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

D. $\frac{\sqrt{13}}{3}$

Answer: D

Watch Video Solution

41. An ellipse slides between two straight lines at right angles to each other. The focus of its centre is part of

A. the circle

B. another ellipse

C. the director circle

D. a parabola

Answer: A

Watch Video Solution

42. In the ellipse $9x^2 - 5y^2 = 45$ the distance between the foci is

A. $4\sqrt{5}$

B. 3

C. $3\sqrt{5}$

D. 4

Answer: D

Watch Video Solution

43. t_1 and t_2 are the parameters of the end-points f a focal chord of a parabola. Then

A. $t_1 + t_2 = -1$

B. $t_1 t_2 = -1$

C. $t_1 t_2 = 1$

D. $t_1 + t_2 = +1$

Answer: B

Watch Video Solution

44. The vertex of the parabola $y^2 = x + 4y + 3$ is

A. (-7, 2)

B. (7, 2)

C. (7, -2)

D. (-7, -2)

Answer: A

Watch Video Solution

45. The radical axis of the circles

$x^2 + y^2 + 2x + 2y + 1 = 0$and

$x^2 + y^2 - 10x - 6y + 14 = 0$ is

A. $4x + 3y - 11 = 0$

B. $3x - 4y + 11 = 0$

C. $12x - 8y + 13 = 0$

D. $12x + 8y - 13 = 0$

Answer: D

Watch Video Solution

46. The equation of the circle described on the line joining the points (-2, -1) and (3, 4) as diameter is

A. $x^2 + y^2 + x + 3y + 10 = 0$

B. $x^2 + y^2 - x - 3y - 10 = 0$

C. $x^2 + y^2 - x + 3y + 10 = 0$

D. $x^2 + y^2 + x + 3y - 10 = 0.$

Answer: B

Watch Video Solution

47. $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ represents two parallel straight lines if

A. $abc + 2fgh - af^2 - bg^2 - ch^2 = 0$

B. $h^2 = ab, af^2 = bg^2$

C. $a + b = 0$

D. $h^2 + ab = 0, af^2 + bg^2 = 0$

Answer: B

Watch Video Solution

48. The angle between the lines $6x^2 + 5xy - 6y^2 = 0$ is

A. 90°

B. 60°

C. 45°

D. 30°

Answer: A

Watch Video Solution

49. If $\tan^{-1} 3 + \tan^{-1} x = \tan^{-1} 8$, then $x =$

A. 5

B. $1/5$

C. 3

D. $1/3$

Answer: B

Watch Video Solution

50. The general solution of $\tan 3x = 1$ is

A. $n\pi + \frac{\pi}{4}$

B. $n\pi$

C. $\frac{n\pi}{3} + \frac{\pi}{12}$

D. $n\pi \pm \frac{\pi}{4}$

Answer: C

Watch Video Solution

51. $\cos^{-1}.\frac{2}{\sqrt{5}} + \tan^{-1}.\frac{1}{3} =$

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

B. $\tan^{-1}.\frac{2}{\sqrt{5}}$

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

D. $\tan^{-1}.\frac{1}{7}$

Answer: C

Watch Video Solution

52. $\sin\left(2\cos^{-1}.\frac{3}{5}\right) =$

A. $\frac{2\sqrt{6}}{5}$

B. $\frac{24}{25}$

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

D. $\frac{1}{4}$

Answer: B

Watch Video Solution

53. If ω is a cube root of unity $\left(1-2\omega+\omega^2\right)^6 =$

A. 729

B. 81

C. 243

D. 216

Answer: A

Watch Video Solution

54. If $x_r = \cos. \frac{\pi}{2^r} + i \sin. \frac{\pi}{2^r}$, then $x_1 x_2 x_3 .... \infty =$

A. 0

B. π

C. 1

D. -1

Answer: D

Watch Video Solution

55. $\left(\frac{1+\cos.\frac{\pi}{8}+i\sin.\frac{\pi}{8}}{1+\cos.\frac{\pi}{8}-i\sin.\frac{\pi}{8}}\right)^{8}=$

A. $1+i$

B. 1

C. $1-i$

D. -1

Answer: D

Watch Video Solution

56. $(1+i)^4+(1-i)^4=$

A. 8

B. 4

C. -8

D. -4

Answer: B

Watch Video Solution

57. $\left|\frac{1}{(2+i)^2}-\frac{1}{(2-i)^2}\right|$

A. $\frac{\sqrt{8}}{5}$

B. $\frac{5}{\sqrt{8}}$

C. $\frac{25}{8}$

D. $\frac{8}{25}$

Answer: D

Watch Video Solution

58. The amplitude of $\frac{1+\sqrt{3i}}{\sqrt{3}+i}$ is

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

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

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

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

Answer: B

Watch Video Solution

Watch Video Solution

59. If $\frac{\cos A}{a} = \frac{\cos B}{b} = \frac{\cos C}{c}$, then the ΔABC is

A. isosceles

B. equilateral

C. right angled

D. no conclusion

Answer: B

Watch Video Solution

60. If $\tan A = \frac{1}{3}$ and $\tan B = \frac{2}{7}$, then $\cot(A - B) =$

A. 23

B. $\frac{1}{23}$

C. 32

D. $\frac{1}{32}$

Answer: A

Watch Video Solution