MATHS

BOOKS - KCET PREVIOUS YEAR PAPERS

KARNATAKA CET 2019

Mathematics

1. The inverse of the matrix $\begin{bmatrix} 2 & 5 & 0 \\ 0 & 1 & 1 \\ -1 & 0 & 3 \end{bmatrix}$ is

A. $\begin{bmatrix} 3 & -1 & 1 \\ -15 & 6 & -5 \\ 5 & -2 & 2 \end{bmatrix}$

B. $\begin{bmatrix} 3 & -15 & 5 \\ -1 & 6 & -2 \\ 1 & -5 & 2 \end{bmatrix}$

C. $\begin{bmatrix} 3 & -5 & 5 \\ -1 & -6 & -2 \\ 1 & -5 & 2 \end{bmatrix}$

D. $\begin{bmatrix} 3 & -15 & 5 \\ -1 & 6 & -2 \\ 1 & -5 & -2 \end{bmatrix}$

Answer: B

Watch Video Solution

2. If P and Q are symmetric matrices of the same order then PQ- QP is

A. identity matrix

B. zero matrix

C. symmetric matrix

D. skew symmetric matrix

Answer: D

Watch Video Solution

3. If $3A + 4B' = \begin{bmatrix} 7 & -10 & 17 \\ 0 & 6 & 31 \end{bmatrix}$ and $2B - 3A' \begin{bmatrix} -1 & 18 \\ 4 & 0 \\ -5 & -7 \end{bmatrix}$ then $B =$

A. $\begin{bmatrix} 1 & 3 \\ -1 & 1 \\ 2 & 4 \end{bmatrix}$

B. $\begin{bmatrix} -1 & -18 \\ 4 & -16 \\ -5 & -7 \end{bmatrix}$

C. $\begin{bmatrix} 1 & -3 \\ -1 & 1 \\ 2 & 4 \end{bmatrix}$

D. $\begin{bmatrix} 1 & 3 \\ -1 & 1 \\ 2 & -4 \end{bmatrix}$

Answer: A

Watch Video Solution

4. If A = $\begin{bmatrix} 1 & 3 \\ 4 & 2 \end{bmatrix}$, B = $\begin{bmatrix} 2 & -1 \\ 1 & 2 \end{bmatrix}$, then $|ABB'|$ =

A. 50

B. 100

C. -250

D. 250

Answer: C

Watch Video Solution

5. If the value of a third order determinant is 16, then the value of the determinant formed by replacing each of its elements by its cofactor is

A. 96

B. 256

C. 48

D. 16

Answer: B

Watch Video Solution

6. $\int x^2 \sin 3x dx$ =

A. $-\frac{x^3\cos 3x}{3}-\frac{x^2\sin 3x}{3}+\frac{2x\cos 3x}{9}-\frac{2\sin 3x}{27}+C$

B. $-\frac{x^3\cos 3x}{3}+\frac{x^2\sin 3x}{3}+\frac{2x\cos 3x}{9}-\frac{2\sin 3x}{27}+C$

C. $\frac{x^3\cos 3x}{3}+\frac{x^2\sin 3x}{3}-\frac{2x\cos 3x}{9}-\frac{2\sin 3x}{27}+C$

D. $-\frac{x^3\cos 3x}{3}+\frac{x^2\sin 3x}{3}-\frac{2x\cos 3x}{9}-\frac{2\sin 3x}{27}+C$

Answer: B

Watch Video Solution

7. The area of the region above X-axis included between the parabola y^2 = x and the circle x^2+y^2 = 2x in square units is

A. $\frac{\pi}{4}-\frac{3}{2}$

B. $\frac{2}{3}-\frac{\pi}{4}$

C. $\frac{3}{2}-\frac{\pi}{4}$

D. $\frac{\pi}{4}-\frac{2}{3}$

Answer: D

Watch Video Solution

8. The area of the region bound by Y-axis, y = cos x and y = sin x, $0 \leq x \leq \frac{\pi}{2}$ is

A. $2\left(\sqrt{2}-1\right)$ sq. units

B. $\left(\sqrt{2}+1\right)$ sq. units

C. $\sqrt{2}$ sq. units

D. $\left(2-\sqrt{2}\right)$ sq. units

Answer: A

Watch Video Solution

9. The integrating factor of the differential equation $\left(2x+3y^2\right)dy = ydx(y>0)$ is

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

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

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

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

Answer: D

Watch Video Solution

10. The equation of the curve passing through the point (1, 1) such that the slope of the tangent at any point (x, y) is equal to the product of its coordinates is

A. $2\log x = y^2 - 1$

B. $2\log y = x^2 - 1$

C. $2\log y = x^2 + 1$

D. $2\log x = y^2 + 1$

Answer: B

Watch Video Solution

11. Foot of the perpendicular drawn from the point (1,3, 4) to the plane 2x – y + z+ 3 = 0) is

A. (-1,4,3)

B. (1, 2, - 3)

C. (0,- 4, – 7)

D. (-3,5,2)

Answer: A

Watch Video Solution

12. Acute angle between the line $\frac{x-5}{2}=\frac{y+1}{-1}=\frac{z+4}{1}$ and the plane 3x – 4y – Z + 5 = 0 is

A. $\cos^{-1}\left(\frac{9}{\sqrt{364}}\right)$

B. $\cos^{-1}\left(\frac{5}{2\sqrt{13}}\right)$

C. $\sin^{-1}\left(\frac{9}{\sqrt{364}}\right)$

D. $\sin^{-1}\left(\frac{5}{2\sqrt{13}}\right)$

Answer: B

Watch Video Solution

13. The distance of the point (1, 2, 1) from the line $\frac{x-1}{2}=\frac{y-2}{1}=\frac{z-3}{2}$ is

A. $\frac{2\sqrt{3}}{5}$

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

C. $\frac{2\sqrt{5}}{3}$

D. $\frac{20}{3}$

Answer: C

Watch Video Solution

14. XY-plane divides the line joining the points A(2, 3, -5) and B(-1, - 2, - 3) in the ratio

A. 2:1 internally

B. 5:3 internally

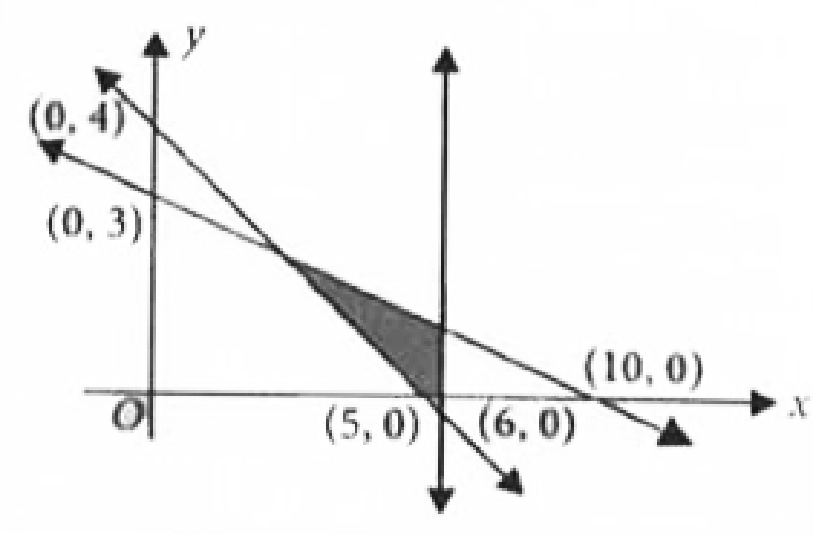
C. 3:2 externally

D. 5:3 externally

Answer: D

 Watch Video Solution

15. The shaded region in the figure is the solution set of the inequations



A. $4x + 5y \geq 20, 3x + 10y \leq 30, x \leq 6, x, y \geq 0$

B. $4x + 5y \leq 20, 3x + 10y \leq 30, x \leq 6, x, y \geq 0$

C. $4x + 5y \geq 20, 3x + 10y \leq 30, x \geq 6, x, y \geq 0$

D. $4x + 5y \leq 20, 3x + 10y \leq 30, x \geq 6, x, y \geq 0$

Answer: A

Watch Video Solution

16. The constant term in the expansion of $\begin{vmatrix} 3x+1 & 2x-1 & x+2 \\ 5x-1 & 3x+2 & x+1 \\ 7x-1 & 3x+1 & 4x-1 \end{vmatrix}$ is

A. 0

B. -10

C. 2

D. 6

Answer: D

Watch Video Solution

17. If [x] represents the greatest integer function and $f(x)$ = x - [x] - cos x, then $f'\left(\frac{\pi}{2}\right)$ =

A. 0

B. 2

C. 1

D. does not exist

Answer: B

Watch Video Solution

18. If $f(x) = \left\{ \left(\frac{\sin 3x}{e^{2x} - 1}, , , x \neq 0 \right), (k - 2, :, x = 0) \right.$ is

Continuous at x=0, then k=

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

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

C. $\frac{9}{5}$

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

Answer:

Watch Video Solution

19. If $f(x) = \sin^{-1}\left[\frac{2^{x+1}}{1+4^x}\right]$ then f' (0) =

A. 2 log 2

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

C. log 2

D. $\frac{4\log 2}{5}$

Answer: C

Watch Video Solution

20. If x = $a\sec^2\theta$, $y = a\tan^2\theta$, then $\frac{d^2y}{dx^2}$

A. 2a

B. 0

C. 1

D. 4

Answer: B

Watch Video Solution

21. If α and β are roots of the equation x^2 + x + 1 = 0, then $\alpha^2 + \beta^2$ is

A. 1

B. $\frac{-1 - i\sqrt{3}}{2}$

C. $\frac{-1 + i\sqrt{3}}{2}$

D. -1

Answer: D

Watch Video Solution

22. The number of 4 digit numbers without repetition that can be formed using the digits 1, 2, 3, 4, 5, 6,7 in which each number has two odd digits and two even digits is

A. 432

B. 450

C. 436

D. 454

Answer: A

Watch Video Solution

23. The number of terms in the expansion of $\left(x^2+y^2\right)^{25}-\left(x^2-y^2\right)^{25}$ after simplification is

A. 0

B. 26

C. 13

D. 50

Answer: C

Watch Video Solution

24. The third term of a G.P. is 9. The product of its first five terms is

A. 3^5

B. 3^{10}

C. 3^9

D. 3^{12}

Answer: B

Watch Video Solution

25. A line cuts of equal intercepts on the coordinate axes. Find the angle made by the line with the positive x - axis.

A. 45°

B. 120°

C. 90°

D. 135°

Answer: D

Watch Video Solution

26. The eccentricity of the ellipse $9x^2 + 25y^2 = 225$ is

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

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

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

D. $\sqrt{\frac{9}{16}}$

Answer: A

Watch Video Solution

27. $\sum_{r=1}^{n}(2r-1)=x$ then

$$\lim_{n\to\infty}\left[\frac{1^3}{x^2}+\frac{2^3}{x^2}+\frac{3^3}{x^2}+\ldots\ldots+\frac{n^3}{x^2}\right]=$$

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

B. 1

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

D. 4

Answer: C

Watch Video Solution

28. The negation of the statement "All continuous functions are differentiable" is

A. All continuous functions are not differentiable

B. Some continuous functions are not differentiable

C. Some continuous functions are differentiable

D. All differentiable functions are continuous

Answer: B

Watch Video Solution

29. Mean and standard deviation of 100 items are 50 and 4 respectively. The sum of all squares of the items is

A. 251600

B. 266000

C. 256100

D. 261600

Answer: A

Watch Video Solution

30. Two letters are chosen from the letters of the word 'EQUATIONS'. The probability that one is vowel and the other is consonant is

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

B. $\frac{3}{9}$

C. $\frac{4}{9}$

D. $\frac{5}{9}$

Answer: D

Watch Video Solution

31. $f: R \to R$ and $g: [0, \infty) \to R$ is defined by $f(x) = x^2$ and $g(x) = \sqrt{x}$. Which one of the following is not true?

A. gof (4) = 4

B. fog (2) = 2

C. fog (- 4) = 4

D. gof (- 2) = 2

Answer: C

Watch Video Solution

32. If A $= \{x \mid x \in N, x \leq 5\}, B = \{x \mid x \in Z, x^2 - 5x + 6 = 0\}$, then the number of onto functions from A to B is

A. 2

B. 30

C. 23

D. 32

Answer: B

Watch Video Solution

33. On the set of positive rationals, a binary operation $*$ is defined by a $*$ b = $\frac{2ab}{5}$ If 2 $*$ x= 3^{-1}, then x =

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

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

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

D. $\frac{125}{48}$

Answer: D

Watch Video Solution

34. $\cos\left[2\frac{\sin^{-1}3}{4}+\frac{\cos^{-1}3}{4}\right]$

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

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

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

D. does not exist

Answer: A

Watch Video Solution

35. If $a + \frac{\pi}{2} < 2\tan^{-1}x + 3\cot^{-1}x < b$ then 'a' and 'b' are respectively

A. 0 and π

B. 0 and 2π

C. $\frac{\pi}{2}$ and 2π

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

Answer: C

Watch Video Solution

36. If $|3x - 5| \leq 2$, then

A. $-1 \leq x \leq \frac{7}{3}$

B. $1 \leq x \leq \frac{9}{3}$

C. $1 \leq x \leq \frac{7}{3}$

D. $-1 \leq x \leq \frac{9}{3}$

Answer: C

Watch Video Solution

37. A random variable 'X' has the following probability distribution:

X	1	2	3	4	5	6	7
$P(X)$	$k-1$	$3k$	k	$3k$	$3k^2$	k^2	k^2+k

Then the value of k is

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

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

C. -2

D. $\frac{1}{10}$

Answer: B

Watch Video Solution

38. If A and B are two events of a sample space S such that P(A) = 0.2, P(B) = 0.6 and P(A|B) = 0.5, then P(A'|B) =

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

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

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

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

Answer: B

Watch Video Solution

39. If 'X' has a binomial distribution with parameters n=6, p and P(X=2)=12, P(X=3)=5 then P=

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

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

C. $\frac{16}{21}$

D. $\frac{5}{16}$

Answer:

Watch Video Solution

40. A man speaks truth 2 out of 3 times. He picks one of the natural numbers in the set S = {1, 2, 3, 4, 5, 6, 7} and reports that it is even. The probability that it is actually even is

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

B. $\frac{1}{10}$

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

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

Answer: D

Watch Video Solution

41. The order of the differential equation

$y = C_1 e^{C_2 + x} + C_3 e^{C_4 + x}$ is

A. 1

B. 3

C. 2

D. 4

Answer: A

Watch Video Solution

42. If $\left|\vec{a}\right| \equiv 16, \left|\vec{b}\right| = 4$ then, $\sqrt{\left|\vec{a} \times \vec{b}\right|^2 + \left|\vec{a} . \vec{b}\right|^2}$ =

A. 4

B. 16

C. 8

D. 64

Answer: D

Watch Video Solution

43. If the angle between $\vec{a}$ and $\vec{b}$ is $\frac{2\pi}{3}$ and the projection of $\vec{a}$ in the direction of $\vec{b}$ is – 2, then $\left|\vec{a}\right|$ =

A. 4

B. 2

C. 3

D. 1

Answer: A

Watch Video Solution

44. A unit vector perpendicular to the plane containing the vectors $\hat{i}+2\hat{j}+\hat{k}$ and $-2\hat{i}+\hat{j}+3\hat{k}$ is

A. $\frac{\hat{i}+\hat{j}+\hat{k}}{\sqrt{3}}$

B. $\frac{-\hat{i}+\hat{j}-\hat{k}}{\sqrt{3}}$

C. $\frac{\hat{i}+\hat{j}-\hat{k}}{\sqrt{3}}$

D. $\frac{-\hat{i}-\hat{j}-\hat{k}}{\sqrt{3}}$

Answer: B

Watch Video Solution

45. $\left[\vec{a}+2\vec{b}-\vec{c}, \vec{a}-\vec{b}, \vec{a}-\vec{b}-\vec{c}\right]$ =

A. 0

B. $2\left[\vec{a}, \vec{b}, \vec{c}\right]$

C. $\left[\vec{a}, \vec{b}, \vec{c}\right]$

D. $3\left[\vec{a}, \vec{b}, \vec{c}\right]$

Answer: D

Watch Video Solution

46. $\sqrt[3]{y}\sqrt{x} = \sqrt[6]{(x+y)^5}$, then $\frac{dy}{dx}$ =

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

B. x - y

C. x + y

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

Answer: D

Watch Video Solution

47. Roll's theorem is not applicable in which one of the following cases?

A. $f(x) = x^2 - 4x + 5$ in [1,3]

B. $f(x) = |x|$ in [-2,2]

C. $f(x) = x^2 - x$ in [0,1]

D. $f(x) = [x]$ in [2.5,2.7]

Answer: B

Watch Video Solution

48. THe interval in which the function $f(x) = x^3 - 6x^2 + 9x + 10$ is increasing in

A. $(-\infty, 1) \cup (3, \infty)$

B. [1,3]

C. $(-\infty, 1] \cup [3, \infty)$

D. $(-\infty, -1] \cup [3, \infty)$

Answer: C

Watch Video Solution

49. The side of an equilateral triangle are increasing at the rate of 2 cm/sec. The rate at which its area is increasing, when the side is 14 cm

A. $10\sqrt{3}cm^2/\sec$

B. $42cm^2/\sec$

C. $14\sqrt{3}cm^2/\sec$

D. $14cm^2/\sec$

Answer: c

Watch Video Solution

50. The value of $\sqrt{24.99}$ is

A. 4.999

B. 5.001

C. 4.899

D. 4.897

Answer: A

Watch Video Solution

51. $\int_{-3}^{3} \cot^{-1} x dx =$

A. 3π

B. 6π

C. 0

D. 3

Answer: A

Watch Video Solution

52. $\int \frac{1}{\sqrt{x}+x\sqrt{x}}dx =$

A. $2\log\left(\sqrt{x}+1\right)+C$

B. $\tan^{-1}\sqrt{x}+C$

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

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

Answer: D

Watch Video Solution

53.

$\int \frac{2x-1}{(x-1)(x+2)(x-3)}dx = A\log|x-1|+B\log|x+2|+C\log|x-3|$

, then A,B,C are respectively

A. $\frac{-1}{6}\frac{1}{3}\frac{-1}{2}$

B. $\frac{1}{6}\frac{-1}{3}\frac{1}{3}$

C. $\frac{1}{6}\frac{1}{3}\frac{1}{5}$

D. $\frac{-1}{6}\frac{-1}{3}\frac{1}{2}$

Answer: D

Watch Video Solution

54. $\int_0^2 [x^2]dx =$

A. $5-\sqrt{2}-\sqrt{3}$

B. $5-\sqrt{2}+\sqrt{3}$

C. $5+\sqrt{2}-\sqrt{3}$

D. $-5-\sqrt{2}-\sqrt{3}$

Answer: A

Watch Video Solution

55. $\int_0^1 \sqrt{\frac{1+x}{1-x}}dx =$

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

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

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

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

Answer: C

Watch Video Solution

56. If U is the universal set with 100 elements, A and B are two sets such that n(A) = 50, n (B) = 60, $n(A \cap B)$ = 20 then $n(A' \cap B')$ =

A. 40

B. 90

C. 20

D. 10

Answer: D

Watch Video Solution

57. The domain of the function $f: R \to R$ defined by $f(x) = \sqrt{x^2 - 7x + 12}$ is

A. $(-\infty, 3] \cup [4, \infty)$

B. $(-\infty, 3] \cap [4, \infty)$

C. $(-\infty, 3] \cup (4, \infty)$

D. (3,4)

Answer: A

Watch Video Solution

58. If cos x = |sin x|, then the general solution is

A. $x = n\pi \pm \frac{\pi}{4}, n \in Z$

B. $x = n\pi + (-1)^n \frac{\pi}{4}, n \in Z$

C. $x = 2n\pi \pm \frac{\pi}{4}, n \in Z$

D. $x = (2n+1)\pi \pm \frac{\pi}{4}, n \in Z$

Answer: A

Watch Video Solution

59. Show that $\sqrt{3}\ \text{cosec}\ 20^\circ - \sec 20^\circ = 4$

A. 2

B. 4

C. 3

D. 1

Answer: B

Watch Video Solution

60. If $P(n): 2^n < n!$

Then the smallest positive integer for which $P(n)$ is true if

A. 2

B. 4

C. 3

D. 5

Answer: B

Watch Video Solution