MATHS

BOOKS - NDA PREVIOUS YEARS

QUESTION PAPER 2021

Multiple Choice Questions

1. $C(n, 0) + C(n, 1) + C(n, 2) + ... + C(n, n) =$

A. $2 + 2^2 + 2^3 P + ... + 2^n$

B. $1 + 2 + 2^2 + 2^3 + ... + 2^n$

C. $1 + 2 + 2^2 + 2^3 + 2^3 + ... + 2^{n-1}$

D. $2 + 2^2 + 2^3 + \ldots . + 2^{n-1}$

Answer: A

Watch Video Solution

2. What is the sum of the coefficients of first and last terms in the expansion of $(1+x)^{2n}$, where n is a natural number?

A. 1

B. 2

C. n

D. 2n

Answer: B

Watch Video Solution

3. If the first term of an AP is 2 and the sum of the first five terms is equal to one-fourth of the sum of the next five terms, then what is the sum of the first ten terms?

A. -500

B. -250

C. 500

D. 250

Answer: B

Watch Video Solution

4. Consider the following statements :

1. If each term of a GP is multiplied by same non-zero number, then the resulting sequence is also a GP.

2. If each term of a GP is divided by same non-zero number, then the resulting sequence is also a GP.

Which of the above statements is/are correct?

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neither 1 nor 2

Answer: C

Watch Video Solution

5. How many 5-digit prime numbers can be formed using the digits $1, 2, 3, 4, 5$ if the repetition of digits is not allowed?

A. 5

B. 4

C. 3

D. 0

Answer: D

Watch Video Solution

6. If $f(x+1) = x^2 - 3x + 2$ then $f(x)$ is equal to

A. $x^2 - 5x + 4$

B. $x^2 - 5x + 6$

C. $x^2 + 3x + 3$

D. $x^2 - 3x + 1$

Answer: B

Watch Video Solution

7. If $x^2, x, -8$ are in AP, then which one of the following is correct?

A. $x \in \{-2\}$

B. $x \in \{4\}$

C. $x \in \{-2, 4\}$

D. $x \in \{-4, 2\}$

Answer: C

Watch Video Solution

8. The third term of a GP is 3. What is the product of the first five terms?

A. 81

B. 243

C. 729

D. Cannot be determined due to insufficient data

Answer: B

Watch Video Solution

9. The element in the i^{th} row and the j^{th} column of a determinant of third order is equal to $2(i+j)$. What is the value of the determinant?

A. 0

B. 2

C. 4

D. 6

Answer: A

Watch Video Solution

10. With the numbers $2, 4, 6, 8,$ all the possible determinants with these four different elements are constructed. What is the sum of the values of all such determinants?

A. 128

B. 64

C. 32

D. 0

Answer: D

Watch Video Solution

11. What is the radius of the circle

$4x^2 + 4y^2 - 20x + 12y - 15 = 0$?

A. 14 units

B. 10.5 units

C. 7 units

D. 3.5 units

Answer: D

Watch Video Solution

12. A parallelogram has three consecutive vertices (-3, 4), (0, -4) and (5,2). The fourth vertex is

A. (2, 10)

B. (2, 9)

C. (3, 9)

D. (4, 10)

Answer: A

Watch Video Solution

13. If the lines y + px = 1 and y-qx = 2 are perpendicular, then which one of the following is correct?

A. $pq + 1 = 0$

B. $p + q + 1 = 0$

C. $pq - 1 = 0$

D. $p - q + 1 = 0$

Answer: C

Watch Video Solution

14. If A, B and C are in AP, then the straight line $Ax + 2By + C = 0$ will always pass through a fixed point. The fixed point is

A. (0,0)

B. (-1, 1)

C. (1, -2)

D. (1, -1)

Answer: D

Watch Video Solution

15. If the image of the point (-4, 2) by a line mirror is (4, -2), then what is the equation of the line mirror?

A. y=x

B. y=2x

C. 4y = x

D. y = 4x

Answer: B

Watch Video Solution

16. $\tan^{-1} x + \cot^{-1} x = \frac{\pi}{2}$ holds, when

A. $x \in R$

B. $x \in R - (-1, 1)$ only

C. $x \in R - \{0\}$ only

D. $x \in R[-1, 1)$ only

Answer: A

Watch Video Solution

17. If $\tan A = \frac{1}{7}$, then what is cos2A equal to ?

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

B. $\frac{18}{25}$

C. $\frac{12}{25}$

D. $\frac{6}{25}$

Answer: A

Watch Video Solution

18. The sides of a triangle are m, n and $\sqrt{m^2+n^2+mn}$., What is the sum of the acute angles of the triangle?

A. 45°

B. 60°

C. 75°

D. 90°

Answer:

Watch Video Solution

19. What is the area of the triangle ABC with sides a = 10 cm, c=4 cm and angle B = 30° ?

A. $16cm^2$

B. $12cm^2$

C. $10cm^2$

D. $8cm^2$

Answer: C

Watch Video Solution

20. Consider the following statements :

1. A = {1, 3, 5} and B = {2,4,7} are equivalent sets.

2. A = {1, 5,9} and B = {1, 5, 5, 9,9} are equal sets.

Which of the above statements is/are correct?

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neither 1 nor 2

Answer: C

Watch Video Solution

21. Consider the following statements :

1. The null set is a subset of every set.

2. Every set is a subset of itself.

3. If a set has 10 elements, then its power set will have 1024 elements.

Which of the above statements are correct?

A. 1 and 2 only

B. 2 and 3 only

C. 1 and 3 only

D. 1, 2 and 3

Answer: D

Watch Video Solution

22. Let R be a relation defined as xRy if and only if $2x + 3y = 20$, where $x, y \in N$. How many elements of the form (x, y) are there in R?

A. 2

B. 3

C. 4

D. 6

Answer: B

Watch Video Solution

23. Consider the following statements :

1. A function $f: Z \to Z$, defined by $f(x) = x + 1$, is one-one as well as onto.

2. A function $f: N \to N$, defined by $f(x) = x + 1$, is one-one but not onto.

Which of the above statements is/are correct?

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neither 1 nor 2

Answer: C

Watch Video Solution

24. Consider the following in respect of a complex number Z :

1. $\overline{\left(Z^{-1}\right)} = \left(\overline{Z}\right)^{-1}$

2. $ZZ^{-1} = |Z|^2$

Which of the above is/are correct?

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neither 1 nor 2

Answer: A

Watch Video Solution

25. Consider the following statements in respect of an arbitrary complex number Z :

1. The difference of Z and its conjugate is an imaginary number.

2. The sum of Z and its conjugate is a real number.

Which of the above statements is/are correct?

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neither 1 nor 2

Answer: C

Watch Video Solution

26. What is the modulus of the complex number $i^{2n+1}(-i)^{2n-1}$, where $n \in N$ and $i = \sqrt{-1}$?

A. -1

B. 1

C. $\sqrt{2}$

D. 2

Answer: A

Watch Video Solution

27. If α and β are the roots of the equation $4x^2 + 2x - 1 = 0$, then which one of the following is correct?

A. $\beta = -2\alpha^2 - 2\alpha$

B. $\beta = 4\alpha^2 - 3\alpha$

C. $\beta = \alpha^2 - 3\alpha$

D. $\beta = -\alpha - \frac{1}{2}$

Answer:

Watch Video Solution

28. If one root of the polynomial $f(x) = 5x^2 + 13x + k$ is reciprocal of the other, then the value of k is (a) 0 (b) 5 (c) $\frac{1}{6}$ (d) 6

A. 2

B. 3

C. 5

D. 8

Answer: C

Watch Video Solution

29. In how many ways can a team of 5 players be selected from 8 players so as not to include a particular player?

A. 42

B. 35

C. 21

D. 20

Answer: C

Watch Video Solution

30. What is the coefficient of the middle term in the expansion of $\left(1+4x+4x^2\right)^5$?

A. 8064

B. 4032

C. 2016

D. 1008

Answer: A

Watch Video Solution

31. If tan $x = -\frac{3}{4}$ and x is in the second quadrant, then what is the value of $\sin x \cdot \cos x$?

A. $\frac{6}{25}$

B. $\frac{12}{25}$

C. $-\frac{6}{25}$

D. $-\frac{12}{25}$

Answer: D

Watch Video Solution

32. What is the value of the following?

$$\operatorname{cosec}\left(\frac{7\pi}{6}\right)\sec\left(\frac{5\pi}{3}\right)$$

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

B. 4

C. -4

D. $-\frac{4}{\sqrt{3}}$

Answer: B

Watch Video Solution

33. If the determinant

$$\begin{vmatrix} x & 1 & 3 \\ 0 & 0 & 1 \\ 1 & x & 4 \end{vmatrix} = 0$$

then what is x equal to ?

A. -2 or 2

B. -3 or 3

C. -1 or 1

D. 3 or 4

Answer: C

Watch Video Solution

34. What is the value of the following?

$\tan 31^\circ \tan 33^\circ \tan 35^\circ \ldots\ldots \tan 57^\circ \tan 59^\circ$

A. -1

B. 0

C. 1

D. 2

Answer: C

Watch Video Solution

35. If

$$f(x) = \begin{vmatrix} 1 & x & x+1 \\ 2x & x(x-1) & x(x+1) \\ 3x(x-1) & 2(x-1)(x-2) & x(x+1)(x-1) \end{vmatrix}$$

then what is $f(-1) + f(0) + f(1)$ equal to ?

A. 0

B. 1

C. 100

D. -100

Answer: A

Watch Video Solution

36. If $\sin^{-1} x - \cos^{-1} x = \frac{\pi}{6}$ then x=

A. no solution

B. unique solution

C. two solutions

D. infinite number of solutions

Answer: B

Watch Video Solution

37. What is the values of the following?

$(\sin 24^\circ + \cos 66^\circ)(\sin 24^\circ - \cos 66^\circ)$

A. -1

B. 0

C. 1

D. 2

Answer: B

Watch Video Solution

38. A chord subtends an angle 120° at the centre of the circle of radius 1 unit . What is the length of the chord?

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

B. $\sqrt{3}-1$ units

C. $\sqrt{2}$ units

D. $\sqrt{3}$ units

Answer: D

Watch Video Solution

39. Prove that

$(1+\cot\theta-\operatorname{cosec}\theta)(1+\tan\theta+\sec\theta)=2.$

A. 1

B. 2

C. 3

D. 4

Answer: B

Watch Video Solution

40. What is $\frac{1+\tan^2\theta}{1+\cot^2\theta} - \left(\frac{1-\tan\theta}{1-\cot\theta}\right)^2$ equal to ?

A. 0

B. 1

C. $2\tan\theta$

D. $2\cot\theta$

Answer: A

Watch Video Solution

41. What is the interior angle of a regular octagon of side length 2 cm?

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

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

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

D. $\frac{3\pi}{8}$

Answer: B

Watch Video Solution

42. If $7\sin\theta + 24\cos\theta = 25$, then what is the value of $(\sin\theta + \cos\theta)$?

A. 1

B. $\frac{26}{25}$

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

D. $\frac{31}{25}$

Answer: D

Watch Video Solution

43. A ladder $6m$ long reaches a point $6m$ below the top of a vertical flagstaff. From the foot of the ladder, the elevation of the top of the flagstaff is 75°. What is the height of the flagstaff?

A. $12m$

B. $9m$

C. $\left(6+\sqrt{3}\right)m$

D. $\left(6+3\sqrt{3}\right)m$

Answer: D

Watch Video Solution

44. The shadow of a tower is found to be x metre longer, when the angle of elevation of the sun changes from 60° to 45°. If the height of the tower is $5\left(3+\sqrt{3}\right)$ m, then what is x equal to ?

A. 8 m

B. 10 m

C. 12 m

D. 15 m

Answer:

Watch Video Solution

45. If $3\cos\theta = 4\sin\theta$, then what is the value of $\tan(45^\circ + \theta)$?

A. 10

B. 7

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

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

Answer: B

Watch Video Solution

46. The smallest positive integer n for which

$$\left(\frac{1-i}{1+i}\right)^{n^2} = 1$$

where $i = \sqrt{-1}$, is

A. 2

B. 4

C. 6

D. 8

Answer: A

Watch Video Solution

47. The value of x, satisfying the equation $\log_{\cos x} \sin x = 1$, where $0 < x < \frac{\pi}{2}$, is

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

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

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

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

Answer: C

Watch Video Solution

48. If Δ is the value of the determinant

$$\begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix}$$

then what is the value of the following determinant?

$$\begin{vmatrix} pa_1 & b_1 & qc_1 \\ pa_2 & b_2 & qc_2 \\ pa_3 & b_3 & qc_3 \end{vmatrix}$$

$(p \neq 0 \text{ or } 1, q \neq 0 \text{ or } 1)$

A. $p\Delta$

B. $q\Delta$

C. $(p+q)\Delta$

D. $pq\Delta$

Answer: D

Watch Video Solution

49. If $C_0, C_1, C_2, \ldots, C_n$ are the coefficients in the expansion of $(1+x)^n$, then what is the value of $C_1 + C_2 + C_3 + \ldots + C_n$?

A. 2^n

B. $2^n - 1$

C. 2^{n-1}

D. $2^n - 2$

Answer: B

Watch Video Solution

50. If $a+b+c=4$ and $ab+bc+ca=0$, then what is the value of the following determinant?

$$\begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix}$$

A. 32

B. -64

C. -128

D. 64

Answer: B

Watch Video Solution

51. The number of integer values of k, for which the equation $2\sin x = 2k + 1$ has a solution, is

A. zero

B. one

C. two

D. four

Answer: C

Watch Video Solution

52. If $a_1, a_2, a_3, \ldots, a_9$ are in GP, then what is the value of the following determinant?

$$\begin{vmatrix} \ln a_1, \ln a_2, \ln a_3 \\ \ln a_4, \ln a_5, \ln a_6 \\ \ln a_7, \ln a_8, \ln a_9 \end{vmatrix}$$

A. 0

B. 1

C. 2

D. 4

Answer: A

 Watch Video Solution

53. If the roots of the quadratic equation $x^2 + 2x + k = 0$ are real, then

A. $k < 0$

B. $k \leq 0$

C. $k < 1$

D. $k \leq 1$

Answer: D

Watch Video Solution

54. In n = 10!, then what is the value of the following?

$$\frac{1}{\log_2 n} + \frac{1}{\log_3 n} + \frac{1}{\log_4 n} + \ldots\ldots + \frac{1}{\log_{10} n}$$

A. 0

B. 1

C. 2

D. 3

Answer: B

Watch Video Solution

55. If $Z = 1 + i$, where $i = \sqrt{-1}$, then what is the modulus of $Z + \frac{2}{Z}$?

A. 1

B. 2

C. 3

D. 4

Answer: B

Watch Video Solution

56. If A and B are two matrices such that AB if of order n $\times$ n, then which one of the following is correct?

A. A and B should be square matrices of same order.

B. Either A or B should be a square matrix.

C. Both A and B should be of same order.

D. Orders of A and B need not be the same.

Answer: D

Watch Video Solution

57. How many matrices of different orders are possible with elements comprising all prime numbers less than 30 ?

A. 2

B. 3

C. 4

D. 6

Answer:

Watch Video Solution

58. $A = \begin{vmatrix} p & q \\ r & s \end{vmatrix}$

where p, q, r and s are any four different prime numbers less than 20. What is the maximum value of the determinant ?

A. 215

B. 311

C. 317

D. 323

Answer:

Watch Video Solution

59. If A and B are square matrices of order 2 such that $\det(AB) = \det(BA)$, then which one of the following is correct?

A. A must be a unit matix.

B. B must be unit matrix.

C. Both A and B must be unit matrices.

D. A and B need not be unit matrices.

Answer: C

Watch Video Solution

60. What is $\cot 2x \cot 4x - \cot 4x \cot 6x - \cot 6x \cot 2x$ equal to ?

A. -1

B. 0

C. 1

D. 2

Answer:

Watch Video Solution

61. If M is the mean of n observations $x_1 - k, x_2 - k, x_3 - k, \ldots, x_n - k$, where k is any

real number, then what is the mean of $x_1, x_2, x_3 \ldots, x_n$?

A. M

B. $M + k$

C. $M - k$

D. kM

Answer: B

Watch Video Solution

62. What is the sum of deviations of the variate values $73, 85, 92, 105, 120$ from their mean?

A. -2

B. -1

C. 0

D. 5

Answer: C

Watch Video Solution

63. Let x be the HM and y be the GM of two positive numbers m and n. If $5x = 4y$, then which one of the following is correct?

A. 5m = 4n

B. $2m = n$

C. $4m = 5n$

D. $m = 4n$

Answer: D

Watch Video Solution

64. If the mean of a frequency distribution is 100 and the coefficient of variation is 45%, then what is the value of the variance?

A. 2025

B. 450

C. 45

D. 4.5

Answer: A

Watch Video Solution

65. Let two events A and B be such that $P(A) = L$, $P(B) = M$ and $P(A \cup B) = 1$. Which one of the following is correct?

A. $P(A \mid B) < \dfrac{L + M - 1}{M}$

B. $P(A \mid B) > \dfrac{L + M - 1}{M}$

C. $P(A \mid B) \geq \dfrac{L + M - 1}{M}$

D. $P(A \mid B) = \dfrac{L + M - 1}{M}$

Answer: D

Watch Video Solution

66. For which of the following sets of numbers do the mean, median and mode have the same value?

A. 12, 12, 12, 12, 24

B. 6, 18, 18, 18, 30

C. 6, 6, 12, 30, 36

D. 6, 6, 6, 12, 30

Answer: B

Watch Video Solution

67. The mean of 12 observations is 75. If two observations are discarded, then the mean of the remaining observations is 65. What is the mean of the discarded observations?

A. 250

B. 125

C. 120

D. Cannot be determined due to insufficient data

Answer: B

Watch Video Solution

68. If k is one of the roots of the equation $x(x+1)+1=0$, then what is its other root?

A. 1

B. $-k$

C. k^2

D. $-k^2$

Answer: C

Watch Video Solution

69. The geometric mean of a set of observations is computed as 10. The geometric mean obtained when each observation x_i is replaced by $3x_i^4$ is

A. 810

B. 900

C. 30000

D. 81000

Answer: C

Watch Video Solution

70. If $P(A \cup B) = \frac{5}{6}, P(A \cap B) = \frac{1}{3}$ and $P(\overline{A}) = \frac{1}{2}$, then which of the following is/are correct?

1. A and B are independent events.

2. A and B are mutually exclusive events.

Select the correct answer using the code given below.

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neither 1 nor 2

Answer: A

Watch Video Solution

71. The average of a set of 15 observations is recorded, but later it is found that for one observation, the digit in the tens place was wrongly recorded as 8 instead of 3. After correcting the observation, the average is

A. reduced by $\frac{1}{3}$

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

C. reduced by $\frac{10}{3}$

D. reduced by 50

Answer: C

Watch Video Solution

72. A coin is tossed twice. If E and F denote occurrence of head on first toss and second toss respectively, then what is $P(E \cup F)$ equal to ?

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

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

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

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

Answer: C

Watch Video Solution

73. In a binomail distribution , then mean is $\frac{2}{3}$ and the variance is $\frac{5}{9}$. What is the probability that $X = 2?$.

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

B. $\frac{25}{36}$

C. $\frac{25}{54}$

D. $\frac{25}{216}$

Answer: D

Watch Video Solution

74. If the mode of the scores 10, 12, 13, 15, 15, 13, 12, 10, x is 15, then what is the value of x?

A. 10

B. 12

C. 13

D. 15

Answer: D

Watch Video Solution

75. If A and B are two events that $P(A) = \frac{3}{4}$ and $P(B) = \frac{5}{8}$, then consider the following statements:

1. The minimum value of $P(A \cup B)$ is $\frac{3}{4}$.

2. The maximum value of $P(A \cap B)$ is $\frac{5}{8}$.

Which of the above statements is/are correct?

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neither 1 nor 2

Answer: C

Watch Video Solution

76. What is the derivative of e^x with respect to x^e ?

A. $\frac{xe^x}{ex^e}$

B. $\frac{e^x}{x^e}$

C. $\frac{xe^x}{x^e}$

D. $\frac{e^x}{ex^e}$

Answer: A

Watch Video Solution

77. If a differentiable function f(x) satisfies

$$\lim_{x \to -1} \frac{f(x)+1}{x^2-1} = \frac{3}{2}$$

Then what is $\lim_{x \to -1} f(x)$ equal to ?

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

B. -1

C. 0

D. 1

Answer: B

Watch Video Solution

78. If the function

$$f(x) = \begin{cases} a + bx, & x < 1 \\ 5, & x = 1 \\ b - ax, & x > 1 \end{cases}$$

is continuous, then what is the value of $(a + b)$?

A. 5

B. 10

C. 15

D. 20

Answer: A

Watch Video Solution

79. Consider the following statements in respect of the function f(x) = sinx :

1. f(x) increases in the interval $(0, \pi)$.

2. f(x) decreases in the interval $\left(\frac{5\pi}{2}, 3\pi\right)$.

Which of the above statements is/are correct?

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neither 1 nor 2

Answer: B

Watch Video Solution

80. What is the domain of the function $f(x) = 3^x$?

A. $(-\infty, \infty)$

B. $(0, \infty)$

C. $[0, \infty)$

D. $(-\infty, \infty) - \{0\}$

Answer: A

Watch Video Solution

81. If the general solution of a differential equation is $y^2 + 2cy - cx + c^2 = 0$, where c is an arbitary constant, then what is the order of the differential equation ?

A. 1

B. 2

C. 3

D. 4

Answer: A

Watch Video Solution

82. What is the degree of the following differential equation ?

$$x = \sqrt{1 + \frac{d^2y}{dx^2}}$$

A. 1

B. 2

C. 3

D. Degree is not defined

Answer: A

Watch Video Solution

83. Which one of the following differential equations has the general solution $y = ae^{x} + be^{-x}$?

A. $\frac{d^2y}{dx^2} + y = 0$

B. $\frac{d^2y}{dx^2} - y = 0$

C. $\frac{d^2y}{dx^2} + y = 1$

D. $\frac{dy}{dx} - y = 0$

Answer: B

Watch Video Solution

84. What is the solution of the following differential equation ?

$$\ln\left(\frac{dy}{dx}\right) + y = x$$

A. $e^x + y^y = c$

B. $e^{x+y} = c$

C. $e^x - e^y = c$

D. $e^{x-y} = c$

Answer: C

Watch Video Solution

85. What if $\int e^{\left(2\ln x + \ln x^2\right)} dx$ equal to ?

A. $\frac{x^4}{4} + c$

B. $\frac{x^3}{3} + c$

C. $\frac{2x^5}{5} + c$

D. $\frac{x^5}{5} + c$

Answer: D

Watch Video Solution

86. Consider the following measures of central tendency for a set of N number :

1. Arithmetic mean

2. Geometric mean

Which of the above uses/use all the datA ?

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neither 1 nor 2

Answer: C

 Watch Video Solution

87. The numbers of Science, Arts and Commerce graduates working in a company are 30, 70 and 50 respectively. If these 'figures are represented by a pie chart, then what by a pie chart, then what is the angle corresponding to Science graduates ?

A. 36°

B. 72°

C. 120°

D. 168°

Answer: B

Watch Video Solution

88. For a histogram based on a frequency distribution with unequal class intervals, the frequency of a class should be proportional ot

A. the height of the rectangle

B. the area of the rectangle

C. the width of the rectangle

D. the perimeter of the rectangle

Answer: B

Watch Video Solution

89. The coefficient of correlation is independent of

A. change of scale only

B. change of origin only

C. both change of scale and change of origin

D. neither change of scale nor change or origin

Answer: C

Watch Video Solution

90. The following table gives the frequency distribution of number of peas per pea pod of 198 pods :

Number of peas	1	2	3	4	5	6	7
Frequency	4	33	76	50	26	8	1

What is the median of this distribution ?

A. 3

B. 4

C. 5

D. 6

Answer: A

Watch Video Solution

91. If $\lim_{x \to \alpha} \frac{\alpha^x - x^\alpha}{x^\alpha - \alpha^\alpha} = -1$

then what is the value of α ?

A. -1

B. 0

C. 1

D. 2

Answer: C

Watch Video Solution

92. A particle starts from origin with a velocity (in m/s) given by the equation $\frac{dx}{dt} = x + 1$. The time (in second) taken by the particle to traverse a distance of 24 m is

A. ln 24

B. ln 5

C. 2 ln 5

D. 2 ln 4

Answer: C

Watch Video Solution

93. What is

$$\int_0^a \frac{f(a-x)}{f(x)+f(a-x)}dx$$

equal to ?

A. a

B. 2a

C. 0

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

Answer: D

Watch Video Solution

94. What is $\lim_{x \to -1} \frac{x^3 + x^2}{x^2 + 3x + 2}$ equal to ?

A. 0

B. 1

C. 2

D. 3

Answer: B

Watch Video Solution

95. If $\int_0^a \{f(x) + f(-x)\}dx = \int_{-a}^a \phi(x)dx$ then $\phi(x)$=_____.

A. f(x)

B. f(-x) + f(x)

C. $-f(x)$

D. None of the above

Answer: A

Watch Video Solution

96. What is the area bounded by $y = \sqrt{16 - x^2} y > 0$, and the x - axis ?

A. 16π square units

B. 8π square units

C. 4π square units

D. 2π square units

Answer: B

Watch Video Solution

97. The curve $y = -x^3 + 3x^2 + 2x - 27$ has the maximum slope at

A. $x = -1$

B. $x = 0$

C. $x = 1$

D. $x = 2$

Answer: C

Watch Video Solution

98. A 24 cm long wire is bent to form a triangle with one of the angles as 60°. What is the altitude of the triangle having the greatest possible area ?

A. $4\sqrt{3}cm$

B. $2\sqrt{3}cm$

C. $6cm$

D. $3cm$

Answer:

Watch Video Solution

99. If $f(x) = e^{|x|}$, then which one of the following is correct ?

A. $f'(0) = 1$

B. $f'(0) = -1$

C. $f'(0) = 0$

D. $f'(0)$ does not exist

Answer: D

 Watch Video Solution

100. What is

$$\int \frac{dx}{\sec x + \tan x}$$

equal to ?

A. $\ln(\sec x) + \ln|\sec x + \tan x| + c$

B. $\ln(sex) - \ln|\sec x + \tan x| + c$

C. $\sec x \tan x - \ln|\sec x - \tan x| + c$

D. $\ln|\sec x + \tan x| - \ln|\sec x| + c$

Answer: D

Watch Video Solution

101. What is

$$\int \frac{dx}{\sec^2\left(\tan^{-1} x\right)}$$

equal to

A. $\sin^{-1} x + c$

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

C. $\sec^{-1} x + c$

D. $\cos^{-1} x + c$

Answer: B

Watch Video Solution

102. If $x + y = 20$ and P=xy, then what is the maximum value of P?

A. 100

B. 96

C. 84

D. 50

Answer: A

Watch Video Solution

103. What is the derivative of $\sin(\ln x) + \cos(\ln x)$ with respect to x at x=e?

A. $\frac{\cos 1 - \sin 1}{e}$

B. $\frac{\sin 1 - \cos 1}{e}$

C. $\frac{\cos 1 + \sin 1}{e}$

D. None of these

Answer: A

Watch Video Solution

104. If $x = e^t \cos t$ and $y = e^t \sin t$, then what is $\frac{dx}{dy}$ at t=0 equal to?

A. 0

B. 1

C. 2e

D. -1

Answer: B

Watch Video Solution

105. what is the maximum value of sin2x cos2x?

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

B. 1

C. 2

D. 4

Answer: A

Watch Video Solution

106. Consider the following statements in respect of the points (p,p-3),(q+3,q) and (6,3) :

1. The points lie on a straight line.

2. The points always lie in the first quadrant only for any value of p and q.

Which of the above statements is/are correct?

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neither 1 nor 2

Answer: A

Watch Video Solution

107. What is the acute angle between the lines $x - 2 = 0$ and $\sqrt{3}x - y - 2 = 0$?

A. 0°

B. 30°

C. 45°

D. 60°

Answer:

Watch Video Solution

108. The point of intersection of diagonals of a square ABCD is at the origin and one of its vertices is at a(4,2). What is the equation of the diagonal BD?

A. $2x + y = 0$

B. $2x - y = 0$

C. $x + 2y = 0$

D. $x - 2y = 0$

Answer: A

Watch Video Solution

109. If any point on a hyperbola is $(3\tan\theta, 2\sec\theta)$ then eccentricity of the hyperbola is

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

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

C. $\frac{\sqrt{11}}{2}$

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

Answer: D

Watch Video Solution

110. Consider the following with regard to eccentricity (e) of conic section

1. $e = 0$ for circle

2. $e = 1$ for parabola

3. $e < 1$ for ellipse

Which of the above are correct?

A. 1 and 2 only

B. 2 and 3 only

C. 1 and 3 only

D. $1, 2$ and 3

Answer: D

Watch Video Solution

111. What is the angle between the two lines having direction ratios (6,3,6) and (3,3,0)?

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

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

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

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

Answer: B

Watch Video Solution

112. If l,m,n are the direction cosines of the line $x-1=2(y+3)=1-z$, then what is $l^4+m^4+n^4$

equal to?

A. 1

B. $\frac{11}{27}$

C. $\frac{13}{27}$

D. 4

Answer:

Watch Video Solution

113. What is the projection of the line segment joining $A(1, 7, -5)$ and $B(-3, 4, -2)$ on $y-$ axis?

A. 5

B. 4

C. 3

D. 2

Answer: C

Watch Video Solution

114. What is the number of possible values of k for which the line joining the points (k,1,3) and (1,-2,k+1) also passes through the point (15,2,-4)?

A. Zero

B. One

C. Two

D. Infinite

Answer: C

Watch Video Solution

115. The foot of the perpendicular drawn from the origin to the plane $x + y + z = 3$ is

A. $(0, 1, 2)$

B. $(0, 0, 3)$

C. $(1, 1, 1)$

D. $(-1, 1, 3)$

Answer: C

Watch Video Solution

116. A vector $\vec{r} = a\vec{i} + b\vec{j}$ is equally inclined to both x and y axes. If the magnitude of the vetor is 2 units, then what are the values of a and b respectively?

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

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

C. $\sqrt{2}, \sqrt{2}$

D. 2,2

Answer: C

Watch Video Solution

117. Consider the following statements in respect of a vector $\vec{c} = \vec{a} + \vec{b}$,where $\left|\vec{a}\right| = \left|\vec{b}\right| \neq 0$:

1. $\vec{c}$ is perpendicular to $\left(\vec{a} - \vec{b}\right)$

2. $\vec{c}$ is perpendicular to $\left(\vec{a} \times \vec{b}\right)$

Which of the above statements is/are correct?

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neither 1 nor 2

Answer: C

Watch Video Solution

118. If $\vec{a}$ and $\vec{b}$ are two vecctors such that $\left|\vec{a}+\vec{b}\right|=\left|\vec{a}-\vec{b}\right|=4$, then which one of the following is correct?

A. $\vec{a}$ and $\vec{b}$ must be unit vector

B. $\vec{a}$ must be parallel to $\vec{b}$

C. $\vec{a}$ must be perpendicular to $\vec{b}$

D. $\vec{a}$ must be equal to $\vec{b}$

Answer: C

Watch Video Solution

119. If $\vec{a}, \vec{b}$ and $\vec{c}$ are coplaner, then what is $\left(2\vec{a} \times 3\vec{b}\right).4\vec{c} + \left(5\vec{b} \times 3\vec{c}\right).6\vec{a}$ equal to?

A. 114

B. 66

C. 0

D. -66

Answer: C

Watch Video Solution

120. Consider the following statements :

1. The cross product of two unit vectors is always a unit vector.

2. The dot product of two unit vectors is always unity.

3. The magnitude of sum of two unit vectors is always greater than the magnitude of their difference.

Which of the above is not correct?

A. 1 and 2 only

B. 2 and 3 only

C. 1 and 3 only

D. $1, 2$ and 3 only

Answer: C

Watch Video Solution

Multiple Choice Question

1. If $x^2 + x + 1 = 0$, then what is the value of $x^{199} + x^{200} + x^{201}$

A. -1

B. 0

C. 1

D. 3

Answer:

Watch Video Solution

Watch Video Solution

2. If x y, z are in GP, then which of the following is/are correct?

1. In (3x), In(3y), in (3z) are in AP

2. xyz +In (x), xyz +ln(y), xyz + ln (z) are in HP

Select the correct answer using the code given below.

A. I only

B. 2 only

C. Both 1 and 2

D. Neither 1 nor 2

Answer:

Watch Video Solution

Watch Video Solution

3. f $\log_{10} 2, \log_{10}(2^x - 1), \log_{10}(2^x + 3)$ are in AP, then what is x equal to?

A. 0

B. 1

C. $\log_2 5$

D. $\log_5 2$

Answer:

Watch Video Solution

4. Let $S = \{2, 3, 4, 5, 6, 7, 9\}$. How many different 3-digit numbers (with all digits different) from S can be made which are less than 500?

A. 30

B. 49

C. 90

D. 147

Answer:

Watch Video Solution

5. If p= (1111... up to n digits), then what is the value of $9p^2 + p$?

A. $10^n p$

B. $2p.10^n$

C. $10^n p - 1$

D. $10^n p + 1$

Answer:

Watch Video Solution

6. The quadratic equation

$3x^2 - \left(k^2 + 5k\right)x + 3k^2 - 5k = 0$

has real roots of equal magnitude and opposite sign.

Which one of the following is correct?

A. $0 < k < \frac{5}{3}$

B. $0 < k < \frac{3}{5}$ only

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

D. No such value of k exists

Answer:

Watch Video Solution

7. If $a_n = n(n!)$, then what is $a_1 + a_2 + a_3 + \ldots\ldots + a_{10}$ equal to ?

A. $10! - 1$

B. $11! + 1$

C. $10! + 1$

D. $11! - 1$

Answer:

Watch Video Solution

8. If p and q are the non-zero roots of the equation $x^2 + px + q = 0$, then how many possible values can q have?

A. Nil

B. One

C. Two

D. Three

Answer:

Watch Video Solution

9. If $\Delta = \begin{vmatrix} a & b & c \\ d & e & f \\ g & h & i \end{vmatrix}$ then what is $\begin{vmatrix} 3d+5g & 4a+7g & 6g \\ 3e+5h & 4b+7h & 6h \\ 3f+5i & 4c+7i & 6i \end{vmatrix}$ equal to ?

A. Δ

B. 7Δ

C. 72Δ

D. -72Δ

Answer:

Watch Video Solution

10. If $\frac{1}{b+c}, \frac{1}{c+a}, \frac{1}{a+b}$ are are in HP, then which of the following is/are correct?

1 a, b, care in AP

2. $(b+c)^2(c+a)^2, (a+b)^2$ are in GP

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neither 1 nor 2

Answer:

Watch Video Solution

11. If $A = \begin{bmatrix} 1 & a \\ 0 & 1 \end{bmatrix}$ where $a \in N$, then what is $A^{100} - A^{50} - 2A^{25}$ equal to ?

A. $-2I$

B. $-I$

C. 2I

D. I

Answer:

Watch Video Solution

12. If

$$\begin{vmatrix} a & -b & a-b-c \\ -a & b & -a+b-c \\ -a & -b & -a-b+c \end{vmatrix} - kabc = 0 (a \neq 0, b \neq 0, c \neq 0)$$

then what is the value of k ?

A. -4

B. -2

C. 2

D. 4

Answer:

Watch Video Solution

13. What is $\sum_{r=1}^{8n+7} i^r$ equal to where $i = \sqrt{-1}$?

A. -1

B. 1

C. i

D. $-i$

Answer:

Watch Video Solution

14. If z = x + iy where $i = \sqrt{-1}$, then what does the equation $z\bar{z} + |z|^2 + 4(z + \bar{z}) - 48 = 0$ represent?

A. Straight line

B. Parabola

C. Circle

D. Pair of straight lines

Answer:

Watch Video Solution

15. Which one of the following is a square root of $2a + 2\sqrt{a^2 + b^2}$, where a , b $\in$ R ?

A. $\sqrt{a+ib}+\sqrt{a-ib}$

B. $\sqrt{a+ib}-\sqrt{a-ib}$

C. $2a+ib$

D. $2a-ib$

Answer:

Watch Video Solution

16. If $\sin\theta$ and $\cos\theta$ are the roots of the equation $ax^2-bx+c=0$, then which of the following selection is correct :

A. $a^2+b^2-2ac=0$

B. $-a^2 + b^2 + 2ac = 0$

C. $a^2 - b^2 + 2ac = 0$

D. $a^2 + b^2 + 2ac = 0$

Answer:

Watch Video Solution

17. If C (n, 4), C (n, 5) and C (n, 6) are in AP, then what is the value of n?

A. 7

B. 8

C. 9

D. 10

Answer:

Watch Video Solution

18. How many 4-letter words (with or without meaning) containing two vowels can be constructed using only the letters (without repetition) of the word 'LUCKNOW?

A. 240

B. 200

C. 150

D. 120

Answer:

Watch Video Solution

19. Suppose 20 distinct points are placed randomly on a circle. Which of the following statements is/are correct?

1. The number of straight lines that can be drawn by joining any two of these points is 380.

2. The number of triangles that can be drawn by joining any three of these points is 1140.

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neither I nor 2

Answer:

Watch Video Solution

20. How many terms are there in the expansion of $\left(\frac{a^2}{b^2}+\frac{b^2}{a^2}+2\right)^{21}$ where a $a \neq 0, b \neq 0$?

A. 21

B. 22

C. 42

D. 43

Answer:

Watch Video Solution

21. For what values of k is the system of equations

$2k^2x + 3y - 1 = 0, 7x - 2y + 3 - 0, 6kx + y + 1 = 0$

consistent?

A. $\frac{3 \pm \sqrt{11}}{10}$

B. $\frac{21 \pm \sqrt{161}}{10}$

C. $\frac{3 \pm \sqrt{7}}{10}$

D. $\frac{4 \pm \sqrt{11}}{10}$

Answer:

Watch Video Solution

22. The inverse of a matrix A is given by $\begin{bmatrix} -2 & 1 \\ \frac{3}{2} & -\frac{1}{2} \end{bmatrix}$

What is A equal to?

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

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

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

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

Answer:

Watch Video Solution

23. What is the period of the function $f(x) = \ln\left(2 + \sin^2 x\right)$?

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

B. π

C. 2π

D. 3π

Answer:

Watch Video Solution

24. If $\sin(A + B) = 1$ and $2\sin(A - B) = 1$, where $0 < A, B < \frac{\pi}{2}$ then what is tan A:tan B equal to?

A. $1:2$

B. $2:1$

C. $1:3$

D. $3:1$

Answer:

Watch Video Solution

25. Consider a regular polygon with 10 sides, What is the number of triangles that can be formed by joining the vertices which have no common side with any of the sides of the polygon?

A. 25

B. 50

C. 75

D. 100

Answer: B

Watch Video Solution

26. Consider all the real roots of the equation $x^4 - 10x^2 + 9 = 0$. What is the sum of the absolute values of the roots?

A. 4

B. 6

C. 8

D. 10

Answer:

Watch Video Solution

27. Consider the expansion of $(1+x)^n$. Let p, q, r and s be the coefficients of first, second, nth and $(n+1)th$ terms respectively. What is $(ps+qr)$ equal to?

A. $1+2n$

B. $1+2n^2$

C. $1 + n^2$

D. $1 + 4n$

Answer:

Watch Video Solution

28. Let $\sin^{-1} x + \sin^{-1} y + \sin^{-1} z = \frac{3\pi}{2}$ for $0 \leq x, y, z \leq 1$ .What is the value of $x^{1000} + y^{1001} + z^{1002}$?

A. 0

B. 1

C. 3

D. 6

Answer: C

Watch Video Solution

29. Let $\sin x + \sin y = \cos x + \cos y$ for all $x, y \in R$. What is $\tan\left(\frac{x}{2} + \frac{y}{2}\right)$ equal to?

A. 1

B. 2

C. $\sqrt{2}$

D. $2\sqrt{2}$

Answer: A

Watch Video Solution

30. Let $A = \begin{bmatrix} 0 & 2 \\ -2 & 0 \end{bmatrix}$ and $(mI + nA)^2 = A$ where m, n are positive real numbers and I is the identity matrix.

What is $(m + n)$ equal to?

A. 0

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

C. 1

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

Answer: D

Watch Video Solution

31. Whet is the value of the following?

$$\cot\left[\sin^{-1}\left(\frac{3}{5}\right)+\cot^{-1}\left(\frac{3}{2}\right)\right]$$

A. $\frac{6}{17}$

B. $\frac{7}{16}$

C. $\frac{16}{7}$

D. $\frac{17}{6}$

Answer:

Watch Video Solution

32. Let $4\sin^2 x - 3$, where $0 \leq x \leq \pi$. What is $\tan 3x$ is equal to?

A. -2

B. -1

C. 0

D. 1

Answer:

Watch Video Solution

33. Let p,q and 3 be respectively the first, third and fifth terms of an A.P. Let d be the common difference. If the

product [pq] is minimum, then what is the value of d?

A. 1

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

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

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

Answer:

Watch Video Solution

34. Consider the following statements for the equation

$x^3 - 8 = 0$

1. The roots are non-collinear.

2. The roots lie on a circle of unit radius.

Which of the above statements is/are correct?

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neither 1 nor 2

Answer:

Watch Video Solution

35. Let the equation secx .cosec x = p have a solution, where p is a positive real number, what should be the

smallest value of p?

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

B. 1

C. 2

D. Minimum does not exist

Answer:

Watch Video Solution

36. For what value of θ, where $0 < \theta < \frac{\pi}{2}$ does $\sin\theta + \sin\theta.\cos\theta$ attain maximum value?

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

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

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

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

Answer:

Watch Video Solution

37. Consider three sets X, y and Z having 6,5 and 4 elements respectively. All these 15 elements are distinct. Let $S = (X - Y) \cup Z$. How many proper subsets does S have?

A. 255

B. 256

C. 1023

D. 1024

Answer:

38. Consider the following statements in respect of relations and functions:

1. All relations are functions but all functions are not relations.

2. A relation from A to B is a subset of Cartesian product A x B.

3. A relation in A is a subset of Cartesian product A x A.

Which of the above statements are correct?

A. 1 and 2 only

B. 2 and 3 only

C. 1 and 3 only

D. 1,2 and 3

Answer:

Watch Video Solution

39. If $\log_{10} 2 \log_2 10 + \log_{10}(10^x) = 2$, then what is the value of x?

A. 0

B. 1

C. $\log_2 10$

D. $\log_5 2$

Answer:

Watch Video Solution

40. Let ABC be a triangle. If $\cos 2A + \cos 2B + \cos 2C = -1$, then which one of the following is correct?

A. $\sin A \sin B \sin C = 0$

B. $\sin A \sin B \cos C = 0$

C. $\cos A \sin B \sin C = 0$

D. $\cos A \cos B \cos C = 0$

Answer: D

Watch Video Solution

41. What is the value of the following determinants?

$$\begin{vmatrix} \cos C & \tan A & 0 \\ \sin B & 0 & -\tan A \\ 0 & \sin B & \cos C \end{vmatrix}$$

A. -1

B. 0

C. 2tanAsinBsinC

D. $-2\tan A\sin B\sin C$

Answer: B

Watch Video Solution

42. Suppose set A consists of first 250 natural numbers that are multiple of 3 and set B consists of first 200 even natural numbers. How many elements does $A \cup B$ have?

A. 324

B. 364

C. 384

D. 400

Answer:

Watch Video Solution

43. Let S, denote the sum of first k terms of on AP. What is $\frac{S_{30}}{S_{20} - S_{10}}$ equal to?

A. 1

B. 2

C. 3

D. 4

Answer:

Watch Video Solution

44. If the roots of the equation,

$4x^3 - (5k - 1)x + 5k = 0$

differ by unity them which one of the following is a possible value of k?

A. 3

B. -1

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

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

Answer:

Watch Video Solution

45. Consider the digits 3,5,7,9. Which is the number of 5 digit numbers formed by these digits in which each of these four digits appears?

A. 240

B. 180

C. 120

D. 60

Answer:

Watch Video Solution

46. How many distinct matrices exist which all four entries taken from (1,2) ?

A. 16

B. 24

C. 32

D. 48

Answer:

Watch Video Solution

47. If $i = \sqrt{-1}$, then how many values does i^{-2n} have for different $n \in Z$?

A. One

B. Two

C. Four

D. Infinite

Answer:

Watch Video Solution

48. If $x = \frac{a}{b-c}, y = \frac{b}{c-a}, z = \frac{c}{a-b}$, then what is the value of the following ?

$$\begin{vmatrix} 1 & -x & x \\ 1 & 1 & -y \\ 1 & z & 1 \end{vmatrix} . \begin{vmatrix} 1 & 1 & -1 \\ 1 & 1 & -1 \\ 1 & 3 & 1 \end{vmatrix}$$

A. 0

B. 1

C. abc

D. $ab + bc + ca$

Answer:

Watch Video Solution

49. Consider the following in respect of the matrix:

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

1. Inverse of A does not exist.

2. $A^3 = A$

3. $3A = A^2$

Which of the above are correct?

A. 1 and 2 only

B. 2 and 3 only

C. 1 and 3 only

D. 1,2 and 3

Answer:

Watch Video Solution

50. Consider the following for the next two que that follow:

A circle is passing through the points [5,-8], (-2,9) and (2,1)

Which are the coordinates of the centre of the circle.

A. [-2,-50]

B. [-50,-20]

C. [-24,-58]

D. [-58,24]

Answer:

Watch Video Solution

51. A circle is passing through the points [5,-8], (-2,9) and (2,1)

If r is the radius of the circle, then which of the following is correct?

A. $r < 10$

B. $10 < r < 30$

C. $30 < r < 60$

D. $r > 60$

Answer:

Watch Video Solution

52. Conider the following for the next two (02 items that follow)

The two vertices of an equilateral triangle are [0.0] and [2,2].

1. The third vertex has least one irrational coordinate

2. The area is irrational

Which of the above statements is/are correct?

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neither 1 nor 2

Answer:

Watch Video Solution

53. Direction: Consider the following for the next two [02] items that follow,

The coordinates of three consecutive vertices of a parallelogram ABCD are A[1,3], B[-1,2] and C[3,5]

What is the equation of the diagonal BD?

A. $2x - 3y + 2 = 0$

B. $3x - 2y + 5 = 0$

C. $2x - 3y + 8 = 0$

D. $3x - 2y - 5 = 0$

Answer:

Watch Video Solution

54. The equations of the sides AB, BC and CA of a triangle ABC are $x-2=0, y+1=0$ and $x+2y-4=0$ respectively.

What is the equation of the altitude through B on AC?

A. $x-3y+1=0$

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

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

D. $2x-y-5=0$

Answer:

Watch Video Solution

55. The locus of a point P(x,y,z) which moves in such a way that z=7 is a

A. line parallel to x-axis

B. line parallel to y-axis

C. line parallel to z-axis

D. plane parallel to xy-plane.

Answer:

Watch Video Solution

56. The xy-plane divides the line joining the points (-1,3,4) aned (2,-5,6)

A. internally in the ratio $2:3$

B. internally in the ratio $3:2$

C. externally in ratio $2:3$

D. extenally in the ratio $2:1$

Answer:

Watch Video Solution

57. Find the number of sphere of radius r touching the coordinate axes.

A. 4

B. 6

C. 8

D. infinite

Answer:

Watch Video Solution

58. If $\vec{a} + 3\vec{b} = 3\hat{i} - \hat{j}$ and $2\vec{a} + \vec{b} = \hat{i} - 2\hat{j}$,then what is the angle between $\vec{a}$ and $\vec{b}$?

A. 0

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

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

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

Answer:

Watch Video Solution

59. If $\left(\vec{a}+\vec{b}\right)$ is perpendicular to $\vec{a}$ and magnitude of $\vec{b}$ is twice that of $\vec{a}$ then what is the value of $\left(4\vec{a}+\vec{b}\right).\vec{b}$ equal to?

A. 0

B. 1

C. $8\left|\vec{a}\right|^2$

D. $8\left|\vec{b}^{2}\right|$

Answer:

Watch Video Solution

60. If the position vectors of A and B are $\left(\sqrt{2}-1\right)\hat{i}-\hat{j}$ and $\hat{i}+\left(\sqrt{2}+1\right)\hat{j}$ respectively, then what is the magnitude of $\vec{A}B$?

A. $2\sqrt{2}$

B. $3\sqrt{2}$

C. $2\sqrt{3}$

D. $3\sqrt{3}$

Answer:

Watch Video Solution

61. If $y = (1+x)(1+x^2)(1+x^4)(1+x^8)(1+x^{16})$ then what is $\frac{dy}{dx}$ at x=0 equal to?

A. 0

B. 1

C. 2

D. 4

Answer:

Watch Video Solution

62. If $y = \cos x . \cos 4x . \cos 8x$, then what is $\frac{1}{y}\frac{dy}{dx}$ at $x = \frac{\pi}{4}$ equal to?

A. -1

B. 0

C. 1

D. 3

Answer: A

Watch Video Solution

63. Let f(x) be a polynomial function such that $f(x) = x^4$. What is f'(1) equal to?

A. 0

B. 1

C. 2

D. 4

Answer:

Watch Video Solution

64. What is $\lim_{n \to \infty} \frac{a^n + b^n}{a^n - b^n}$ where $a > b > 1$, equal to?

A. -1

B. 0

C. 1

D. Limit does not exist

Answer:

Watch Video Solution

65. Let $f(x) = \begin{cases} 1 + \frac{x}{2k} & 0 < x < 2 \\ kx & 2 \leq x < 4 \end{cases}$

If $\lim_{x \to 2} f(x)$ exists, then what is the value of k?

A. -2

B. -1

C. 0

D. 1

Answer:

Watch Video Solution

66. Consider the following statements in respect of $f(x) = |x| - 1$:

1. f(x) is continuous at x=1.

2. f(x) is differentiable at x=0.

Which of the above statement is/are correct?

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neithe 1 nor 2

Answer:

Watch Video Solution

67. If $f(x) = \frac{[x]}{|x|}, x \neq 0$, where [.] denotes the greatest integer function, then what is the right-hand limit of f(x) at x=1?

A. -1

B. 0

C. 1

D. Right-hand limit of f(x) at x=1 does not exist.

Answer:

Watch Video Solution

68. What is the range of the function $f(x) = 1 - \sin x$ defined on entire real line?

A. (0,2)

B. [0,2]

C. $(-1, 1)$

D. $[-1, 1]$

Answer:

Watch Video Solution

69. What is the slope of the tangent of $y = \cos^{-1}(\cos x)$ at $x = -\frac{\pi}{4}$?

A. -1

B. 0

C. 1

D. 2

Answer:

Watch Video Solution

70. What is the integral of $f(x) = 1 + x^2 + x^4$ with respect to x^2?

A. $x + \frac{x^3}{3} + \frac{x^5}{5} + C$

B. $x + \frac{x^3}{3} + \frac{x^5}{5} + C$

C. $x^2 + \frac{x^4}{4} + \frac{x^6}{6} + C$

D. $x^2 + \frac{x^4}{4} + \frac{x^6}{6} + C$

Answer:

Watch Video Solution

71. Consider the following statements in respect of the function $f(x) = x^2 + 1$ in the interval $[1, 2]$:

1. The maximum value of the function is 5.

2. The minimum value of the function is 2.

Which of the above statements is/are correct?

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neithe 1 nor 2

Answer:

Watch Video Solution

72. If f(x) satisfics f(1)=f(4), the what is $\int_1^4 f'(x)dx$ equal to?

A. -1

B. 0

C. 1

D. 2

Answer:

Watch Video Solution

73. What is $\int_0^{\frac{\pi}{2}} e^{\ln(\cos x)}\,dx$ equal to?

A. -1

B. 0

C. 1

D. 2

Answer:

Watch Video Solution

74. If $\int \sqrt{1-\sin 2x}dx = A\sin x + B\cos x + C$, where $0 < x < \frac{\pi}{4}$, then which one of the following is correct?

A. $A + B = 0$

B. $A + B - 2 = 0$

C. $A + B + 2 = 0$

D. $A + B - 1 = 0$

Answer:

Watch Video Solution

75. What is the order of the differential equation of all ellipses whose axes are along the coordinate axes?

A. 1

B. 2

C. 3

D. 4

Answer:

Watch Video Solution

76. What is the degree of the differential equation of all circles touching both the coordinate axes in the first quadrant?

A. 1

B. 2

C. 3

D. 4

Answer: A

Watch Video Solution

77. What is the differential equation of $y = A - \frac{B}{x}$?

A. $xy_2 + y_1 = 0$

B. $xy_2 + 2y_1 = 0$

C. $xy_2 - 2y_1 = 0$

D. $2xy_2 + y_1 = 0$

Answer:

Watch Video Solution

78. What is $\int_0^{\pi} \log\left(\tan\frac{x}{2}\right) dx$ equal to?

A. 0

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

C. 1

D. 2

Answer:

Watch Video Solution

79. Where does the tangent to the curve $y = e^x$ at the point (0,1) meet x-axis?

A. (1,0)

B. $(-1, 0)$

C. (2,0)

D. $\left(-\frac{1}{2}, 0\right)$

Answer:

Watch Video Solution

80. Consider the following statements in respect of the function $f(x) = x + \frac{1}{x}$,

1. The local maximum value of f(x) is less than its local minimum value.

2. The local maximum value of f(x) occurs at x=1.

Which of the above statements is /are correct?

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neithe 1 nor 2

Answer:

Watch Video Solution

81. What is the maximum area of a rectangle that can be inscribed in a circle of radius 2 units?

A. 4 square units

B. 6 square units

C. 8 square units

D. 16 square units

Answer: C

Watch Video Solution

82. $\int \frac{dx}{x(x^2+1)}$

A. $\frac{1}{2}\ln\left(\frac{x^2}{x^2+1}\right)+C$

B. $\ln\left(\frac{x^2}{x^2+1}\right)+C$

C. $\frac{3}{2}\ln\left(\frac{x^2}{x^2+1}\right)+C$

D. $\frac{1}{2}\ln\left(\frac{x^2+1}{x^2}\right)+C$

Answer:

Watch Video Solution

83. What is the derivative of e^{e^x} with respect to e^x ?

A. e^{e^x}

B. e^x

C. $e^{e^x}e^x$

D. ee^x

Answer:

Watch Video Solution

84. What is the condition that $f(x) = x^3 + x^2 + kx$ has no local extremum ?

A. $4k < 1$

B. $3k > 1$

C. $3k < 1$

D. $3k \leq 1$

Answer:

Watch Video Solution

85. If $f(x) = 2^x$, then what is $\int_2^{10} \frac{f'(x)}{f(x)} dx$ equal to ?

A. 4 In 2

B. In 4

C. In 5

D. 8 In 2

Answer:

Watch Video Solution

86. If $\int_{-2}^{0} f(x)dx = k$, then $\int_{-2}^{0} |f(x)|dx$ is

A. less than k

B. greater than k

C. less than or equal to k

D. greater than or equal to k

Answer:

Watch Video Solution

87. If the function $f(x) = x^2 - kx$ is monotonically increasing the interval $(1, \infty)$, then which one of the following is correct ?

A. $k < 2$

B. $2 < k < 3$

C. $3 < k < 4$

D. $k > 4$

Answer:

Watch Video Solution

88. What is the area bounded by y = [x], where [.] is the greatest integer function, the x-axis and the lines x = -1. 5 and x =-1. 8 ?

A. 0.3 square unit

B. 0.4 square unit

C. 0.6 square unit

D. 0.8 square unit

Answer:

Watch Video Solution

89. The tangent to the curve $x^2 = y$ at (1,1) makes an angle θ with the positive direction of x-axis. Which one of the following is correct ?

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

B. $\frac{\pi}{6} < \theta < \frac{\pi}{4}$

C. $\frac{\pi}{4} < \theta < \frac{\pi}{3}$

D. $\frac{\pi}{3} < \theta < \frac{\pi}{2}$

Answer:

Watch Video Solution

90. Consider the following relations for two events E and F:

1. $P(E \cap F) \geq P(E) + P(F) - 1$

2. $P(E \cup F) = P(E) + P(F) + P(E \cap F)$

3. $P(E \cup F) \leq P(E) + P(F)$

Which of the above relations is/are correct ?

A. 1 only

B. 3 only

C. 1 and 3 only

D. 1, 2 and 3

Answer:

Watch Video Solution

91. If $P(A \mid B) < P(A)$, then which one of the following is correct ?

A. $P(B \mid A) < P(B)$

B. $P(B \mid A) > P(B)$

C. $P(B \mid A) = P(B)$

D. $P(B \mid A) > P(A)$

Answer:

Watch Video Solution

92. A problem is given to three students A, B and C, whose probabilities of solving the problem indrependently are $\frac{1}{2}, \frac{3}{4}$ and p respectively, if the probability that the problem can be solved is $\frac{29}{32}$, then what is the value of p ?

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

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

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

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

Answer:

Watch Video Solution

93. In a cricket match, a batsman hits a six 8 times out of 60 balls he play What is the probability that on a ball played he does not hit a six ?

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

B. $\frac{1}{15}$

C. $\frac{2}{15}$

D. $\frac{13}{15}$

Answer:

Watch Video Solution

94. Two regression lines are given as 3x-4y+8=0 and 4x-3y-1 = 0

Consider the following statements :

1. The regression line of y on x is $y = \frac{3}{4}x + 2$

2. The regression line of x on y is $x = \frac{3}{4}y + \frac{1}{4}$.

Which of the above statements is/are correct ?

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neither 1 nor 2

Answer:

Watch Video Solution

95. Two regression lines are given as 3x-4y+8=0 and 4x-3y-1 = 0

Consider the following statements:

1. The coefficient of correlations r is $\frac{3}{4}$.

2. The means of x and y are 3 and 4 respectively.

Which of the above statements is/are correct ?

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neither 1 nor 2

Answer:

Watch Video Solution

96. The marks obtained by 60 students in a certain subject out of 75 are given below :

Marks	Number of students
15–20	4
20–25	5
25–30	11
30–35	6
35–40	5
40–45	8
45–50	9
50–55	6
55–60	4
60–65	2

What is the median ?

A. 35

B. 38

C. 39

D. 40

Answer:

Watch Video Solution

97. The marks obtained by 60 students in a certain subject out of 75 are given below :

Marks	Number of students
15–20	4
20–25	5
25–30	11
30–35	6
35–40	5
40–45	8
45–50	9
50–55	6
55–60	4
60–65	2

What is the mode ?

A. $27 \cdot 27$

B. $27 \cdot 73$

C. $27 \cdot 93$

D. $28 \cdot 27$

Answer:

Watch Video Solution

98. What is the mean of natural numbers contained in the interval (15, 64) ?

A. $36 \cdot 8$

B. $38 \cdot 3$

C. $39 \cdot 5$

D. $40 \cdot 3$

Answer:

Watch Video Solution

99. For the set of number $x, x, x+2, x+3, x+10$ where x is a natural number, which of the following is/are correct ?

&

1. Mean $>$ Mode

2. Median $>$ Mean

Select the correct answer using the code given below.

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neither 1 nor 2

Answer:

Watch Video Solution

100. The mean of 10 observations is 5.5. If each observation is multiplied by 4 and subtracted from 44, then what is the new mean ?

A. 20

B. 22

C. 34

D. 44

Answer:

Watch Video Solution

101. If g is the geometric mean of 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, then which one of the following is correct ?

A. $8 < g < 16$

B. $16 < g < 32$

C. $32 < g < 64$

D. $g > 64$

Answer:

Watch Video Solution

102. If the harmonic mean of 60 and x is 48, then what is the value of x ?

A. 32

B. 36

C. 40

D. 44

Answer: C

Watch Video Solution

103. What is the mean deviation of first 10 even natural numbers ?

A. 5

B. $5 \cdot 5$

C. 10

D. $10 \cdot 5$

Answer:

Watch Video Solution

104. If

$$\sum_{r=1}^{10} x_i = 110 \text{ and } \sum_{i=1}^{10} x_i^2 = 1540$$

then what is the variance ?

A. 22

B. 33

C. 44

D. 55

Answer:

Watch Video Solution

105. 3-digit numbers are formed using the digits 1, 3, 7 without repetion of digits. A number is randonly selected. What is the probability that the number is divisible by 3 ?

A. 0

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

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

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

Answer:

Watch Video Solution

106. What is the probability that the roots of the equation $x^2 + x + n = 0$ are real, where $n \in N$ and $\pi < 4$?

A. 0

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

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

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

Answer:

Watch Video Solution

107. If A and B are two events such that P (not A) $= \frac{7}{10}$, P (not B) = $\frac{3}{10}$ and $P\left(\frac{A}{B}\right) = \frac{3}{14}$, then what is $P\left(\frac{B}{A}\right)$ equal to ?

A. $\frac{11}{14}$

B. $\frac{9}{11}$

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

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

Answer:

Watch Video Solution

108. Seven white balls and three black balls are randomly placed in a row. What is the probability that no two black balls are placed adjecently ?

A. $\frac{7}{15}$

B. $\frac{8}{15}$

C. $\frac{11}{15}$

D. $\frac{13}{15}$

Answer: A

Watch Video Solution