MATHS

BOOKS - S CHAND MATHS (ENGLISH)

SELF ASSESSMENT PAPER 5

Section A

1. A = {1,2,3), B = {2,3}, then A- B is ....

A. {1}

B. $\{\phi\}$

C. ϕ

D. $\{2, 3\}$

Answer:

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2. The maximum value of sin x cos x is ....

A. 1

B. 0

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

D. $\sqrt{2}$

Answer:

3. The value of tan $\dfrac{17\pi}{4}$

A. 1

B. -1

C. $\sqrt{3}$

D. $-\sqrt{3}$

Answer:

4. Which term of the sequence 3, 10, 17, ... is 136?

A. 18th

B. 20th

C. 22nd

D. 24th

Answer:

5. α and β are the roots of the equation $x^2 - 3x + 5 = 0$, the equation whose roots are $\dfrac{1}{\alpha}$ and $\dfrac{1}{\beta}$ is:

A. (a) $x^2 - \dfrac{1}{3}x + 5 = 0$

B. (b) $5x^2 - 3x + 1 = 0$

C. (c) $3x^2 - x + 5 = 0$

D. (d) $5x^2 - 3x + 5 = 0$

Answer:

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6. The number of terms in $(x + y)^{100}(x - y)^{100}$ is _____

A. 101

B. 202

C. 100

D. 200

Answer:

7. The value of modulus of $\dfrac{a + ib}{a - ib}$ is _____

A. $a^2 + b^2$

B. 1

C. $\dfrac{a + b}{a - b}$

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

Answer:

8. The centre and radius of the circle $x^2 + y^2 + 6x + 8y - 11 = 0$ is ....

A. (3,4)

B. (-3,4)

C. (3,-4)

D. (-3,-4)

Answer:

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9. Equation of line passing through (2,3) and parallel to

x + 4y - 5 = 0 is _____

    A. 4x - y + 11 = 0

    B. 4x + y + 6 = 0

    C. x +4y - 14 - 0

    D. x - 4y + 12 = 0

Answer:

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10. $\lim\limits_{x \to 0} \dfrac{1 - \cos 4x}{1 - \cos x}$ = _____

A. 4

B. 16

C. 0

D. 1

Answer:

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11. Find the range of f(x) = $\dfrac{1}{2\sin x + 5}$.

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12. A coin is tossed five times. How many outcomes are possible ?

13. Find the common difference of the A. P, the Sum of whose first n terms is $2n + 5n^2$.

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15. Evaluate $\lim\limits_{x \to 2} \dfrac{x^5 - 32}{x - 2}$

16. Let A and B be two events such that, p(A B)=0.8 and p(A)=0.3, find p(B) if A and B are two independent events

17. If $P = \left\{ x : \dfrac{x - 8}{2} = 4 \right\}$. Is P an empty set? Justify.

18. Prove that: (sin 3 x +sin x) sin x + (cos 3x - cos x) cos x = 0

19. Prove that :

$$(\cos x - \cos y)^2 + (\sin x - \sin y)^2 = 4\sin^2\left(\frac{x-y}{2}\right)$$

20. Evaluate $\tan 15°$.

21. Write the amplitude of $\dfrac{1}{i}$.

22. If α and β are the roots of the equation $px^2 + qx + 1 =$, find $\alpha^2\beta + \beta^2\alpha$.

23. Find the domain and range of the function f(x) = $\dfrac{2x + 1}{x - 2}$.

24. If A + B = $\dfrac{\pi}{4}$, then prove that (1 + tan A) (1 + tan B) = 2

25. Prove that: $\sqrt{2 + \sqrt{2 + 2\cos 4\theta}} = 2\cos\theta$

26. Using mathemtical induction prove that $3^{2n+2} - 8n - 9$ is divisible by 64 for all $n \in N$.

27. Prove by the principal of mathematcal induction that for all $n \in N$.

$$1^2 + 3^2 + 5^2 + \ldots \ldots + (2n - 1)^2 = \frac{n(2n - 1)(2n + 1)}{3}$$

28. Determine the values of m for which the equations $3x^2 + 4mx + 2 = 0$ and $2x^2 + 3x - 2 = 0$ may have a common root.

29. Evaluate $\lim\limits_{x \to 0} \dfrac{\tan 2x - \sin 2x}{x^3}$

30. Find using the first principal of differentiation the derivation of $\sin^2 x$.

31. The sum of the roots of the quadratic equation $ax^2 + bx + c = 0$ is equal to the sum of the squares of their recipocals, prove that $\dfrac{c}{a}, \dfrac{a}{b}, \dfrac{b}{c}$ are in A.P.

32. If $a \, and \, b$ are the roots of $x^2 - 3x + p = 0 \, and \, c, \, d$ are the roots $x^2 - 12x + q = 0$ where a, b, c, d form a G.P. Prove that $(q + p) : (q - p) = 17 : 15$.

33. What are the points on y-axis whose distance from the line $\dfrac{x}{3} + \dfrac{y}{4} = 1 \, is \, 4 \, units$?

34. Calculate the mean, variance and standard devation

for the following data :

Class	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80	80 – 90	90 – 100
Frequency	3	7	12	15	8	3	2

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Section B

1. The eccentricity of the hyperbola $x^2 - y^2 = 100$ is

_____

A. 0

B. 1

C. $\sqrt{2}$

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

Answer:

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2. Distance between the points (2,5,3) and (4,3,1) is _____

units

A. $\sqrt{5}$

B. $2\sqrt{5}$

C. $3\sqrt{5}$

D. $4\sqrt{5}$

Answer:

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3. Find the length of latus rectum of the parabola $y^2 = -10x$

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4. Find the equation of parabola with Focus (0,-6) and vertex (0,0)

5. Write the contrapositive : If 2 and 3 are even, then 2 + 3 = 6'

6. Write the negation of following compound statements :

x = 2 and x = 3 are roots of the quadratic equation $x^2 - 5x + 6 = 0$

7. For any two statements, prove that the implication and its contrapositive are logically equivalent

statements.

8. Find the equation if the ellipse whose axes are along the coordinate axes, vertices are $(\pm 5, 0)$ and foci at $(\pm 4, -0)$.

9. The equation of the hyperbola whose foci are $(\pm 4, 0)$ and length of latus rectum is 12 is

10. Show that the point A(1,-1,3), B(2,-4,5) and C(5,-13,11) are collinear.

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Section C

1. If the median of 5,9,11,3,4,x,8 is 6, then x is ....

  A. 10

  B. 6

  C. 9

  D. 5

Answer:

2. If

$$\sum x = 50, \sum y = -30, \sum xy = 115 \text{ and } n = 10$$

, the covariance is

A. 25

B. 25.5

C. 26

D. 26.5

Answer:

3. The weights (in kg) of 15 students are: 31, 35, 27, 29, 32, 43, 37, 41, 34, 28, 36, 44, 45, 42, 30. Find the median. If the weight 44 kg is replaced by 46 kg and 27 kg by 25 kg, find the new median.

4. One set of 100 observations has the mean 15 and another set of 150 observation has the mean 16. Find the mean of 250 observation by combining the two sets of given observations.

5. Construct Cost of Living Index Number for the year

2018 from the following statistics:

Commodity	2004 Price	2004 Quantity	2018 Price
A	25	16.0	35
B	36	7.0	48
C	12	3.5	16
D	6	2.5	10
E	28	4.0	28

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6. Find the cov (X, Y) between X and Y, if

$\sum u_1 v_1 = 55$ and $n = 11$, where u_1 and v_1 are

deviation of X and Y series from their respective means.

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7. Construct the index numbers for 2014 taking 2010 as the base year from the following data by simple average of price relative method:

Commodities	A	B	C	D	E
Price in 2010 (in ₹)	100	80	160	220	40
Price in 2014 (in ₹)	140	120	180	240	40

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8. Calculate the karl pearson's coefficient of Correlation from the following data and interpret the result.

Serial number of students	1	2	3	4	5	6	7	8	9	10
Marks in Mathematics	15	18	21	24	27	30	36	39	42	48
Marks in Statistics	25	25	27	27	31	33	35	41	41	45

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9. The table shows the averages prices of coffee, sugar and milk in 1979 and 1980, and the weights used to calculate the cost of making a cup of coffee,

	Cost in 1979 (per kg) ₹ (p_o)	Cost in 1980 (per kg) ₹ (p_1)	Weights (w)
Sugar	3	7	3
Milk	3	3.50	4
Coffee	90	120	2

C:alculate, correct to one decimal place, the index number for the cost of a cup of coffee in 1980 using.

(i) weighted price relatives, (ii) weighted aggregates taking the index number for 1979 as 100 in each case.

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11. The production of cement by a firm in years 1 to 9 is given below:

Year	1	2	3	4	5	6	7	8	9
Production (Tonnes)	8	5	7	8	7	8	9	8	12

Calculate the trend values for the above series by the 3 yearly moving average method.

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