



MATHS

BOOKS - S CHAND MATHS (ENGLISH)

SELF ASSESSMENT PAPER 1

Section A

1. Find the domain and range of the function $f(x) = \frac{x^2 - 9}{x - 3}$.

A. $f(x) = R + \{3\}$

B. $f(x) = R - \{3\}$

C. $f(x) = \{3\} - R$

D. $f(x) = \{3\} + R$

Answer:



2. The value of $\cos 225^\circ$ is

A. $\sqrt{2}$

B. $-\sqrt{2}$

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

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

Answer:



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3. The value of $\tan(\pi + x)\tan(\pi - x)\cot^2 x$ is

A. 0

B. 1

C. -1

D. Not defined

Answer:



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4. The conjugate of $\frac{1}{5 - 7i}$ is

A. $\frac{5}{74} - \frac{7}{74}i$

B. $\frac{5}{74} + \frac{7}{74}i$

C. $\frac{7}{74} - \frac{5}{74}i$

D. $\frac{7}{74} + \frac{5}{74}i$

Answer:



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5. If α and β are the roots of the quadratic equation $ax^2 + bx + 1$, then the value of $2\alpha^2\beta^2$ is

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

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

C. $\frac{2}{a^2}$

D. $\frac{2}{b^2}$

Answer:



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6. The number of terms in the expansion of $(1 - 10x + 25x^2)^{20}$ is

A. 40

B. 41

C. 42

D. 43

Answer:



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7. The values of x for which the numbers $\frac{4}{5}$, x , $\frac{5}{4}$ are in G.P. is

A. 0

B. -1

C. $+1$

D. ± 1

Answer:



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8. If the origin is shifted to $(5, -5)$, then the new co-ordinates of $(4, 6)$ will be

A. $(-1, 11)$

B. $(11, -1)$

C. $(-1, -1)$

D. $(-11, -11)$

Answer:



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9. The equation of the circle with centre $(0, 7)$ and radius 7 is

A. $x^2 + y^2 + 14 = 0$

B. $x^2 + y^2 - 14 = 0$

C. $x^2 + y^2 + 14y = 0$

D. $x^2 + y^2 - 14y = 0$

Answer:



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10. $\lim_{x \rightarrow 0} \frac{\sin 5x}{x}$ is equal to

A. 5^2

B. $\frac{1}{5^2}$

C. 5

D. $1/5$

Answer: A::C



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11. Find the number of ways in which 5 boys and 3 girls can be seated in a row so that no two girls are together.



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12. Find the derivative of $9x^2 + \frac{3}{x} + 5 \sin x$ with respect to x .

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13. In a single throw of two dice, determine the probability of not getting the same number on both the dice.

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14. Find the angle between the x -axis and the line joining the points $(3, -1)$ and $(4, -2)$.

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15. Find the middle term(s) in the expansion of $\left(x^2 - \frac{1}{x}\right)^6$.

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16. For any set A and B, show that $(A - B) = (A \cap B')$



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17. Let $A = \{1, 2, 3, 4, 5\}$ and $B = \{1, 4, 5\}$

Let R be a relation is less than from A to B.

Find the domain, co-domain and range of R,



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18. Let $A = \{1, 2, 3, 4, 5\}$ and $B = \{1, 4, 5\}$

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19. Find the general value of x for which $\sqrt{3} \cos ecx = 2$.



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20. prove that $\sin 2x + 2 \sin 4x + \sin 6x = 4 \cos^2 x \cdot \sin x$



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21. Solve : $4 \sin x \cdot \cos x + 2 \sin x + 2 \cos x + 1 = 0$



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22. Represent the complex number $-2i$ in the polar form.



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23. If one root of $x^2 - x - k = 0$ is square of the other, then find the value of k.



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24. Draw the graph of the function

$$f(x) = \begin{cases} 1 & \text{if } x > 0 \\ 0 & \text{if } x = 0 \\ -1 & \text{if } x < 0 \end{cases}, x \in \mathbb{R}$$

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25. If $f(x) = \frac{\cot x}{1 + \cot x}$ and $\alpha + \beta = \frac{5\pi}{4}$, then find $f(\alpha) \cdot f(\beta)$.

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26. In any $\triangle ABC$, prove that

$$a \cos A + b \cos B + c \cos C = 2a \sin B \sin C.$$

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27. Prove by the principle of Mathematical Induction that $\log x^n = n \log x$, for all $n \in \mathbb{N}$.



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28. Find the derivative of $\sqrt{2x+3}$ using the first principle of differentiation.



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29. Evaluate: $\lim_{x \rightarrow 0} \frac{\sin 5x}{\tan 3x}$.



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30. If the coefficient of second, third and fourth terms in the expansion of $(1+x)^{2n}$ are in A.P. then show that $2n^2 - 9n = -7$.



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31. Find a positive value of m for which the coefficient of x^2 in the expansion of $(1 + x)^m$, is 6.

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32. The sum of three consecutive terms of an AP is 15 and their product is 105, find numbers.

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33. Find the equation of a circle concentric with the circle $2x^2 + 2y^2 - 6x + 8y + 1 = 0$ and double of its area.

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34. Find the equation of the lines through the point $(3, 2)$ which make an angle of 45° with the line



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35. Given below are the diameters of circles (in mm) drawn in a design.

Diameter	33 – 36	37 – 40	41 – 44	45 – 48	49 – 52
Number of Circles	15	17	21	22	25

Calculate the mean diameter of the circles, variance and standard deviation.



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Section B

1. The eccentricity of the hyperbola $x^2 - y^2 = 9$ is

- A. $\sqrt{2}$
- B. $-\sqrt{2}$
- C. $\sqrt{3}$
- D. $-\sqrt{3}$

Answer:



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2. The distance of the point $(4, 5, 6)$ from the XY plane is

- A. 2 unit
- B. 4 units
- C. 6 units
- D. 8 units

Answer:



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3. Find the equation of parabola whose focus is $(6, 0)$ and directrix

$$x = -6.$$



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4. Find the equation of the ellipse whose focus is $(1, -2)$, the corresponding directrix $x - y + 1 = 0$ and eccentricity $\frac{2}{3}$.

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5. Write the negation of the statement "Product of 5 and 6 is 30"?

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6. Check the validity of the statement given below by contradiction method.

'Sum of a rational number and an irrational number is an irrational number.'

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7. If it is known that Anita is rich, while Sunita is poor, assign truth values of following statement Anita is poor or Sunita is rich.

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8. If the foci of the ellipse $\frac{x^2}{16} + \frac{y^2}{b^2} = 1$ and the hyperbola $\frac{x^2}{144} - \frac{y^2}{81} = \frac{1}{25}$ coincide, then find the value

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9. Find the length of the major axis of the ellipse whose focus is $(-1, 1)$ directrix is $x - y + 3 = 0$ and eccentricity is $\frac{1}{2}$.

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10. Find the locus of the point, the sum of whose distances from the points $A(4, 0, 0)$ and $B(-4, 0, 0)$ is equal to 10.



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Section C

1. The wholesale price index (or price relative) of tomatoes in 2018 compared to 2016 is 150. If the cost of tomatoes was ₹ 15 per kg in 2016, calculate the cost in 2018.

- A. (a) 16.5
- B. (b) 16.00
- C. (c) 24
- D. (d) 15.00

Answer:



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2. Q_2 is always equal to

A. P10

B. P25

C. P50

D. P75

Answer:

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3. Compute a price index for the following by simple aggregate method :

Commodity	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>
Price in 1986 (₹)	20	30	10	25	40	50
Price in 1991 (₹)	25	30	15	35	45	55

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4. Find the Q2 for the following distribution: 6, 7, 8, 3, 11, 19, 10, 15, 17, 13, 20, 5, 18

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5. Compute D_3 for the following distribution : 3, 13, 11, 11, 5, 4, 2

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6. Out of total sample survey of 100 nuts, in a first sample survey of 35 items has mean 80 and standard deviation 4. A second sample survey of 65 items has mean 70 and standard deviation 3. Find the mean and variance of combined 100 sample nuts.

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7. The following table gives information regarding weekly income of labourer working at a dam site.

Income in (₹)	200 – 300	300 – 400	400 – 500	500 – 600	600 – 700
No. of employees	150	160	130	180	120

Calculate the (i) median (ii) lower quartile (iii) upper quartile (iv) 5th decile.



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8. While calculating correlation coefficient between two variables x and y for 30 pairs of observation, the students observed the following results:

$$\Sigma x = 135, \Sigma x^2 = 680, \Sigma y = 110, \Sigma y^2 = 485 \text{ and } \Sigma xy = 530$$

On rechecking, it was found that he had wrongly copied one pair as $(5, 8)$ whereas value is $(7, 9)$ calculate the correct correlation coefficient between x and y .

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9. Calculate spearman's rank correlation coefficient between the advertisement cost and sales cost of making a Maggie. The following data is given below.

Advertisement cost (₹ in thousand)	40	32	38	32	50	60	55
Sales (₹ in lakhs)	32	35	43	40	42	50	70

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10. Find the consumer price index for 2018 on the basis of 2015 from the following data using a weighted average price relative method.

Items	Price in 2015 (₹)	Price in 2018 (₹)	Weight
Food	200	280	20
Travel	150	180	10
Cloth	180	150	22
Rent	220	250	25
Ice-cream parlour	140	160	10
Fuel	250	300	30



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