MATHS

BOOKS - S CHAND MATHS (ENGLISH)

SAMPLE QUESTION PAPER 5

Section A

1. If $f(x) = \frac{|x-2||x-1|}{|x-3|}$, then value of $f(-2)$ is

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

B. $\frac{-12}{5}$

C. 12

D. 5

Answer: A

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2. If $\sin\theta = \frac{4}{5}$, then the value of $\sec\theta.\ \tan\theta$ is

A. $-9/20$

B. $9/20$

C. $-20/9$

D. $20/9$

Answer: D

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3. The value of $\cos(\pi + x)\cos(\pi + x)\sec^2 x$ is

A. 0

B. 1

C. -1

D. Not defined

Answer: B

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4. the conjugate of $\frac{1}{5+7i}$ is

A. $\frac{4}{74}+\frac{5i}{74}$

B. $\frac{4}{74}-\frac{5i}{74}$

C. $\frac{5}{74}+\frac{4i}{74}$

D. $\frac{5}{74}-\frac{4i}{74}$

Answer: A

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

A. a

B. $-a$

C. b

D. $-b$

Answer: D

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6. The number of terms in the expansion of $\left(49y^2 - 70y + 25\right)^{17}$ is

A. 34

B. 35

C. 36

D. 77

Answer: B

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7. The values of m for which the numbers 4, m, 9 are in G.P. is

A. 0

B. $+6$

C. -6

D. ± 6

Answer: D

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8. If the vertices of a triangle are $(1, 2), (4, k)$ and $(7, 8)$ and its area is 15 sq. units, then the value(s) of k is

A. $-40, 10$

B. $-40, \ -10$

C. $40, \ -10$

D. $40, 10$

Answer: A

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9. The equation of the circle with centre $(6, 0)$ and radius 6 is

A. $x^2 + y^2 - 12 = 0$

B. $x^2 + y^2 + 12 = 0$

C. $x^2 + y^2 - 12x = 0$

D. $x^2 + y^2 + 12x = 0$

Answer: C

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10. $\lim_{x \to 2} \frac{\sqrt{x+2} - \sqrt{x-2}}{x+2}$ is equal to

A. 2

B. 1

C. $1/2$

D. 0

Answer: B

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11. How many permutations can be made out of the letters of the word 'TRIANGLE ' ? How many of these will begin with T and end with E ?

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12. If $y = \sqrt{\frac{1-\cos 2x}{1+\cos 2x}}, x \in \left(0, \frac{\pi}{2}\right) \cup \left(\frac{\pi}{2}, \pi\right)$, then find $\frac{dy}{dx}$.

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13. A bag contains 9 red and 12 white balls one ball is drawn at random. Find the probability that the ball drawn is red.

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14. Solve $4 \leq 2x - 6 \leq 8$.

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15. find the sum of coefficient in $(x+y)^8$.

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16. If $A = \{1, 3, 5, 7, 9\}, B = \{2, 4, 6, 8\}$ and $C = \{2, 3, 5, 7, 11\}$, find $(A \cap B)$ and $(A \cap C)$. What do you conclude?

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17. If A and B are two sets given in such a way that $A \times B$ consists of 6 elements and if three elements of $A \times B$ are (1,5), (2,3) and (3,5), what are the remaining elements?

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18. Prove : $\cos 3x = 4\cos^3 x - 3\cos x$

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19. For any triangle ABC, prove that $a(b\cos C - osB) = b^2 - c^2$

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20. Prove that $\frac{\sin 5x - 2\sin 3x + \sin x}{\cos 5x - \cos x} = \cos ec2x - \cot 2x$

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21. For complex value of z, solve $|z| + z = (2 + i)$

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22. Prove that $(1 - \omega + \omega^2)(1 - \omega^2 + \omega^4)(1 - \omega^4 + \omega^8)(1 - \omega^8 + \omega^{16})....$ to 2^n factors = 2^{2n}.

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23. Find the domain and range of the real function $f(x) = \sqrt{9 - x^2}$

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24. If $a\cos A = b\cos B$, then either the triangle is isosceles or right angled.

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25. In any ΔABC, prove that

$$\frac{(b-c)}{(b+c)} = \frac{\tan\frac{1}{2}(B-C)}{\tan\frac{1}{2}(B+C)}$$

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26. Using the principle of mathematical induction, prove that

$$1.2 + 2.3 + 3.4 + \ldots\ldots + n(n+1) = \frac{1}{3}n(n+1)(n+2)$$

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27. Find the derivative of tan 5x using first principle of differentiation.

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28. Evaluate $\lim_{x \to 0} \frac{(1 - \cos x)}{x^2}$

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29. If the roots of $ax^2 + x + b = 0$ be real and unequal, show that the roots of $\frac{x^2 + 1}{x} = 4\sqrt{ab}$ are imaginary.

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30. If α and β are the roots of equation $2x^2 - x - 3 = 0$, then find a equation having roots $(2\alpha + 3)$ and $(2\beta + 3)$.

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31. If the fourth and nineth terms of a G.P. are 54 and 13122 respectively, find the G.P. Also find its general term.

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32. Find the equation of the bisector of $\angle A$ of ΔABC, whose vertices are $A(-2, 4), B(5, 5)$ and $C(4, 2)$.

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33. Find the equation of a circle passing through the points $(5, 7), (6, 6)$ and $(2, -2)$. Find its centre and radius.

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34. Find the mean for the following data.

Marks obtained	$10-20$	$20-30$	$30-40$	$40-50$	$50-60$	$60-$
Number of students	8	6	12	5	2	7

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Section B

1. The eccentricity of the ellipse $\frac{x^2}{49} + \frac{y^2}{25} = 1$ is

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

B. $\frac{\sqrt{6}}{7}$

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

D. $\frac{2\sqrt{6}}{7}$

Answer: D

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2. If the distance between the points $(2, a, 1)$ and $(-1, -1, 1)$ is 5, then the value(s) of a is

A. $3, 5$

B. $-3, 5$

C. $3, \ -5$

D. $-3, \ -5$

Answer: C

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3. If the parabola $y^2 = 4ax$ passes through the point $(4, 5)$, find the length of its latus rectum.

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4. Find the equation of the hyperbola whose foci are $(\pm 5, 0)$ and vertices are $(\pm 3, 0)$.

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5. Write the negation of the statement, "difference of 7 and 4 is 3"?

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6. Using contradiction method, check the validity of the following statement :

If n is real number with $n > 3$ then $n^2 > 9$.

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7. Check whether the following statement is true or not :

If x and y are odd integers, then xy is an odd integer.'

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8. Find the equation of the ellipse with axes along the x-axis and the y-axis, which passes through the points P(4, 3) and Q(6, 2).

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9. The foci of a hyperbola coincide with the foci of the ellipse $\frac{x^2}{25} + \frac{y^2}{9} = 1$. Find the equation of the hyperbola, if its eccentricity is 2.

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10. Find the coordinates of the points which trisect the line segment joining the points P(4,2,-6) and Q(10,-16,6).

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Section C

1. The wholesale price index (or price relative) of onions in 2019 compared to 2017 is 150. If the cost of onion was ₹ 30 per kg in 2017, calculate the cost in 2019.

A. ₹ 20

B. ₹ 25

C. ₹ 45

D. ₹ 35

Answer: C

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2. D_1 is always equal to

A. P5

B. P10

C. P20

D. P50

Answer: B

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3. The index number of the following data for the year 2019, taking 2018 as base year was found to be 116. The simple aggregate method was used for calculation. Find numerical value of a, b, if the sum of prices is, the year 2019 is ₹ 203.

Item	Price (in ₹) for year 2019	Price in ₹ for year 2018
A	30	10
B	25	20
C	45	25
D	15	30
E	35	a
F	b	50

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4. Find the Q_2 for the following distribution. 30, 42, 33, 31, 40, 45, 34, 47, 39

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5. Compute D_3 for the following distribution :

The third decile of the following data is.

Marks	$0-5$	$5-10$	$10-15$	$15-20$	$20-25$	Total
No. of Students	7	x	25	40	y	120

Find the value of x and y.

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6. Find the median from the following frequency distribution.

Number of students (f)	12	8	32	14	16	3
Marks (x)	40	18	50	100	80	160

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7. From the following frequency distribution, prepare the 'less than' ogive.

Rainfall (in cm)	$5-15$	$15-25$	$25-35$	$35-45$	$45-55$	$55-65$
Number of days	22	10	8	15	5	6

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8. If $\Sigma(x_i - 2) = 10, \Sigma(y_i - 5) = 20, \Sigma x_i y_i = 148$ and $n = 5$, find cov (x, y)

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9. The marks of ten intelligent students in two subjects as given below.

Students	English	Physics
A	88	74
B	74	66
C	80	72
D	76	90
E	40	54
F	65	50
G	68	54
H	80	43
I	40	30
J	43	38

Calculate the rank correlation coefficient and interpret your result.

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10. The profit of a soft drink firm (in lakhs of rupees) during each month of the year is as given below.

Months	Profit (in Lakhs Rupees)
January	42
February	40
March	39
April	35
May	41
June	32
July	40
August	50
September	52
October	56

Calculate the four monthly moving averages and the original data on a graph sheet.

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