



MATHS

BOOKS - S CHAND MATHS (ENGLISH)

MODEL TEST PAPER-8

Section A

1. Let $U = \{1,2,3,4,5,6\}$, $A = \{2,3\}$ and $B = \{3,4,5\}$,
then $n(B' - A) =$

A. 0

B. 1

C. 2

D. 6

Answer: B



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2. Let $A = \{1, 2\}$ and $B = \{3, 4\}$. The number of subsets $A \times B$ have:

A. 4

B. 8

C. 16

D. 15

Answer: C



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3. Value of $\cot \frac{\pi}{8}$ is

A. $\sqrt{2} + 1$

B. $\sqrt{2} - 1$

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

D. None of these

Answer: A



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4. General solution of the equation $\cos^2 x = 0$

A. $(2n + 1)\frac{\pi}{2}, n \in \mathbb{Z}$

B. $n\pi, n \in \mathbb{Z}$

C. $(2n +) \frac{\pi}{4}, \in nZ$

D. 0

Answer: A



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5. If one end of a diameter of the circle $x^2 + y^2 - 6x + 5y - 7 = 0$ is $(-1, 3)$, then the other end point is

A. (7,8)

B. (8,7)

C. (7,-8)

D. (8,-7)

Answer: C



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6. If one root of a quadratic equation is $\frac{1}{i}$

then other root is

A. $-i$

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

C. $2i$

D. i

Answer: D



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7. The letters of the word RANDOM are written in all possible ways and these words are written out as in a dictionary. Position of the first word begins with the letter M is

A. 120

B. 240

C. 360

D. 241

Answer: D



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8. n^{th} term of the series $+ 3 + 33 \div 333 + \dots$ is

A. $\frac{1}{9}(10^n - 1)$

B. $\frac{1}{27}(10^\pi - 1)$

C. $\frac{3}{9}(10^\pi - 1)$

D. None of these

Answer: C



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9. Equation of the line equidistant from the lines $x=-3$ and $x=6$ is

A. $2x - 3 = 0$

B. $3x - 2 = 0$

C. $2y = 3$

D. $3y = 2$

Answer: A



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10. If $f(x) = \log_a x$, $x \in \forall x \neq 0$, $a > 0$, $a \neq 1$

then $f(x) =$

A. $\frac{1}{x} \log a$

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

C. $\frac{1}{x \log a}$

D. $\frac{1}{x} \log e$

Answer: C



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11. If $\frac{x^2 + y^2 - 1 + 1 + i2y}{(x + 1)^2 + y^2}$ is purely

imaginary, then find the value of $[z]$, where z
 $+iy$



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12. The sum of the coefficients of the first three terms of the expansion of $\left(x - \frac{3}{x^2}\right)^n$, $x \neq 0$, $n \in N$ 559. find n.



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13. Using letters of the word 'EXAMINATION', how many words can be formed if vowels occupy odd places?



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14. In an entrance test that is graded on the basis of two examinations, the probability of a randomly chosen student passing the first examination is 0.8 and the probability of passing the second examination is 0.7. The probability of passing at least one of them is 0.95. What is the probability of passing in both the examinations?



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15. Evaluate $\lim_{x \rightarrow 0} \frac{\sin x^\circ}{x}$



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16. Let $A = \{9, 10, 11, 12, 13\}$ and let $f: A \rightarrow N$ defined by $f(n) =$ the highest prime factor of n . Find the range off.



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17. If $f(x) = x^3 - (k - 2)x^2 + 2x$, $\forall x \in R$, is an add function find k .



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18. Find the value of $\cos 15^\circ \cos 7\frac{1^\circ}{2} \sin \frac{1^\circ}{2}$



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19. Find the value of

$$(-1 + \sqrt{3}i)^{100} + (-1 - \sqrt{3}i)^{100}$$



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20. Solve the quadratic inequality

$$x^2 + x - 6 \geq 0$$



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21. There are 100 students in a class. In an examination, 50 of them failed in Mathematics, 45 failed in Physics, 40 failed in Biology and 32 failed in exactly two of the three subjects. Only one student passed in all subjects. Then find

the number of students failed in all the three subjects.



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22. Solve $81^{\sin^2 x} + 81^{\cos^2 x} = 30, 0 \leq x \leq \pi$



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23. Evaluate $\lim_{x \rightarrow 0} \left(\frac{1 + 5x^2}{1 + 3x^2} \right)^{\frac{1}{x^2}}$



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24. Draw the graph of the quadratic function:

$$y = 3 \div 5x - 2x^2.$$

From graph find the maximum/minimum value of the expression. Also determine the sign of the expression.



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25. If α, β are the roots of the equation

$$\lambda(x^2 - x) + x \div 5 = 0 \text{ and } \lambda_1 \text{ and } \lambda_2 \text{ are}$$

two values of λ obtained from $\frac{\alpha}{\beta} + \frac{\beta}{\alpha} = \frac{4}{5}$

then find the value of $\frac{\lambda_1}{\lambda_2^2} + \frac{\lambda_2}{\lambda_1^2}$



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26. A number consists of three digits in G.P the sum of the right hand and left hand digits exceeds twice the middle digit by 1 and the sum of the left hand and middle digits is two-third of the sum of the middle and right hand digits. Find the numbers.



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27. Find the equation of the circles which touch the x-axis at a distance of 4 units from origin and cut off an intercepts of 6 from the y-axis.



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28. A straight line $\frac{x}{a} - \frac{y}{b} = 1$ passes through the point (8,6) and cuts off a triangle of area a b 12 units from the axes of co-ordinates. Find the equations of the straight line.



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29. Find the mean and standard deviation by using short cut method:

Class	20-30	30-40	40-50	50-60	60-70	70-80	80-90
Frequency	3	51	122	141	130	51	2



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Section B

1. The length of the latus rectum of the parabola having vertex $(3, 4)$ and focus $(5, 4)$ is:

A. 4 units

B. 8 units

C. 6 units

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

Answer: B



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2. A point $P(x, y)$ moves so that the sum of its distances from points $(-2, 3)$ and $(2, 0)$ is 5. The locus of P is:

- A. Ellipse
- B. Parabola
- C. Hyperbola
- D. None of these

Answer: D



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3. p : Mr X is alive

q : Mr X is lives in Delhi

Write the following statement in symbolic form: "It is not true that Mr. X is alive and he lives in Delhi."



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4. Find the value of c so that $2x - y + c = 0$ may touch the ellipse $x^2 + 2y^2 = 2$



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5. Find the equation of the locus of a point whose distance from the xy -plane is equal to its distance from the point $(-1, 2, -3)$.

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6. If p is the statement 'Ravi races' and q is the statement 'Ravi wins'. Then write verbal translation of $\sim[p \vee (\sim q)]$

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7. Check the validity of the statement by method of contradiction:

p: sum of an irrational number and a rational number is irrational.



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8. Find the equation of parabola whose vertex is at the point $(-2, 2)$ and whose focus is $(-6, 6)$.



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9. A rod of length 15 cm rests in between two coordinate axes in such a way that the end point A lies on x-axis and end point B lies on y-axis. A point $P(x, y)$ is taken on the rod in such a way that $AP=6$ cm. Show that the locus of P is an ellipse. Also find its eccentricity.



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10. A point R with x-coordinate 4 lies on the line segment joining the points $P(2, -3, 4)$ and $Q(8, 0, 10)$. Find the coordinates of the point R.



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Section C

1. The rank of 13 from the following data is:

13 13 24 6 15 4 2 9 6 19

A. 4

B. 4.5

C. 5.5

D. 6.5

Answer: C



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2. With price index of 2010 as 100, the cost of living index for 2019 is 180. Purchasing power of rupee in 2019 compared to 2010 is,

A. Rs 0.56

B. Rs 1.56

C. *Rs*0.65

D. Rs 1.65

Answer: A



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3. If $u = ax + b$ and $v = cy + d$ then $\text{Cov}(u, v) = ac$
 $\text{Cov}(x, y)$. Then $r(u, v) =$



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4. If the median of $\frac{x}{5}, \frac{x}{4}, \frac{x}{3}, \frac{x}{2}, x$ ($x > 0$) is 8,
the find the value of x .



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5. Using 2005 as base year, the index numbers for the price of commodity in 2006 and 2007 are 118 and 125. Calculate the index number for 2007 if 2006 is taken as base year.



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6. The coefficient of rank correlation between the marks in Statistics and Mathematics obtained by 10 students is $\frac{1}{2}$. It was later

discovered that the difference in ranks in the two subjects obtained by one of the students was wrongly calculated as 3 instead of 7. Find the correct coefficient of rank correlation.



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7. Find r , if $\text{Cov}(x, y) = 16.5$, $\text{Var}(x) = 2.25$ and S.D. of $y = 12$



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8. Find the values of D_8 and P_{75} for the following distribution:

Class	10 – 14	15 – 19	20 – 24	25 – 29	30 – 34	35 – 39
Frequency	3	7	16	12	9	5



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9. Find the mode for the following table of test scores.

Marks	No. of Students
Below 10	5
Below 20	18
Below 30	39
Below 40	76
Below 50	107
Below 60	131
Below 70	134



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10. Calculate the five-yearly moving averages of a number of students studying in a commercial college from the following figures:

Year	1981	1982	1983	1984	1985
No. of Students	32	31	35	39	40
Year	1986	1987	1988	1989	1990
No. of Students	40	41	42	45	48



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