



MATHS

BOOKS - S CHAND MATHS (ENGLISH)

MODEL TEST PAPER -16



- 1. For any two sets A and B, A' B'=
 - A. A-B
 - $\mathsf{B}.\,B-A$
 - $\mathsf{C}.\, A \cup B$

 $\mathsf{D}.\,A\cap B$

Answer: B

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2. If a, b are positive real numbers, then $|x| \leq a \Leftrightarrow$

A. A.
$$-a \leq x \leq a$$

- $\texttt{B. B.} x \leq -a \ \text{or} \ x \geq a$
- $\mathsf{C}.\,\mathsf{C}.\,-a < x < a$
- $\mathsf{D}.\,\mathsf{D}.\,x<\ -a\ \mathrm{or}\ x>\ +a$

Answer: A

3. If the arcs of the same length in two circles subtend angles 65° and 110° at the centre then the ratio of the radii of the circles is

A. 22:13

 $B.\,11:13$

C.22:15

D. 21:13

Answer: A



4. The number of values of heta in $[0,2\pi]$ that satisfies the equation $\sin^2 heta - \cos heta = rac{1}{4}$

A. 4

B. 3

C. 2

D. None of these

Answer: C

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5. If the sum of n terms of an A.P. is $2n^2+5n$, then its n^{th}

term

A. A. 4n-3

 $\mathsf{B}.\,\mathsf{B}.\,3n-4$

 $\mathsf{C.}\,\mathsf{C.}\,4n+3$

D. D. 3n+9

Answer: C

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6. Value of
$$i^{37} + rac{1}{i^{67}}$$

A. 0

B.-1

 $\mathsf{C}.\,2i$

D. -2i

Answer: C



7. 4^{th} term from end in the expansion of $\left(rac{3}{x^2}-rac{x^3}{6}
ight)^7$ is kx^6 ,

then the value of k is

A. A.
$$\frac{53}{48}$$

B. B. $\frac{35}{48}$
C. C. $\frac{48}{35}$
D. D. $\frac{48}{53}$

Answer: B

8. The least positive integer n such that $\left(rac{2i}{1+i}
ight)^n$ is a

positive integer is

A. 16

B. 8

C. 4

D. 2

Answer: B

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9. The angle between the line x = a and by + c = 0, is

A. 0°

 $\mathrm{B.\,60}^{\,\circ}$

C. 180°

D. 90°

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10. The coordinates of the centre of the circle inscribed in the square formed by the lines x=2, x=6, y=5 and y=9 is:

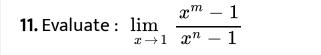
A. A. (4, 7) B. B. (7, 4)

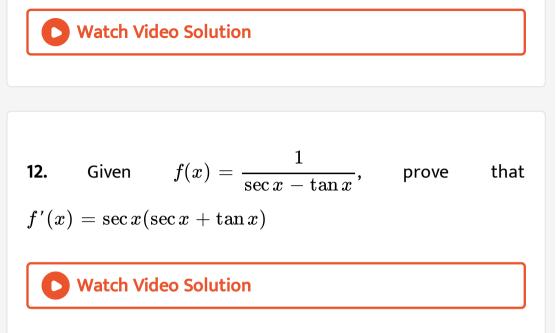
C. C. (3, 6)

D. D. (9, 5)

Answer: A







13. There are three events A, B, and C, one of which one and

only one can happen. The odds are 7 to 4 against A and 3 to 5

favour of B. Find the odds against C.



14. Let P(n) be the statement "7 divides $2^{3n} - 1$." What is P(n+1)?

15. Find the number of terms in the expansion of $\left(1+rac{x^2}{4}-x
ight)^5.$

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16. Prove that for a null set ϕ , $n\{P(P(\phi))\} = 2$.

17. A function f is defined on the set of real numbers as follows:

$$f(x) = \left\{egin{array}{ccc} x+1 & 1 \leq x < 2 \ 2x-1 & 2 \leq x < 4 \ 3x-10 & 4 \leq x < 6 \end{array}
ight.$$

(a) Find the domain of the function.

(b) Find the range of the function.



18. The angles of a triangle ABC are in A.P. and it is being given

that $b \colon c = \sqrt{3} \colon \sqrt{2}$, find $\angle A$.

19. Evaluate :
$$an rac{2\pi}{9} + an rac{\pi}{9} + \sqrt{3} an rac{2\pi}{9} an rac{\pi}{9}$$



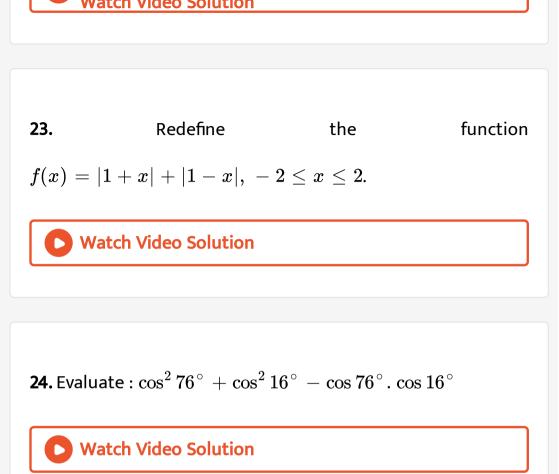
20. If
$$heta=rac{\pi}{7}$$
, show that $\cos\theta\cos2\theta\cos3\theta=rac{1}{8}$.

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21. Express in polar form, hence find the amplitude: z = -1 - i.

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22. Find k so that the roots of the equation $\frac{x^2 - qx}{px - r} = \frac{k - 1}{k + 1}$ may be equal in magnitude but opposite in sign.



25. If $\sin \alpha$. $\sin \beta - \cos \alpha$. $\cos \beta + 1 = 0$, then find the value

of $\cot \alpha$. $\tan \beta$.

26. If
$$y\sqrt{x^2+1}=\log\Bigl(\sqrt{x^2+1}-x\Bigr)$$
, prove that $ig(x^2+1)\dfrac{dy}{dx}+xy+1=0.$

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27. How many words each of 3 vowels and 2 consonants can be formed from the letters of the word INVOLUTE so that consonants never together?



28. 12 persons are invited for a party. In how many different ways can they and the host be seated at a circular table, if two particular persons are to be seated on either side of the host?



29. Prove that
$$rac{6x^2-22x+21}{5x^2-18x+17}$$
 for real values of x lies between 1 and $rac{5}{4}$.

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30. Given that α and β are the roots of the equation $2x^2 - 3x + 4 = 0$, find an equation whose roots are $\alpha + \frac{1}{\alpha}$ and $\beta + \frac{1}{\beta}$.

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31. Find the n^{th} term of the series $2 + rac{5}{9} + rac{7}{27} +$. Hence

find sum to n terms.



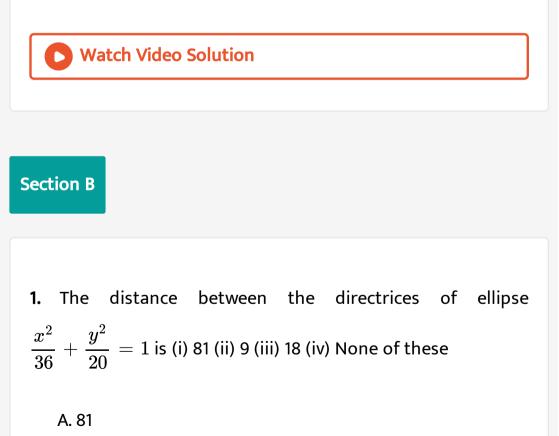
32. Calculate the co-ordinates of the foot of the perpendicular from the point(-4, 2) to the line 3x + 2y=5. Also find the equation of the smallest circle passing through (-4, 2) and having its centre on the line 3x + 2y=5.

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33. A triangle is formed by the lines whose equations are 3x + 4y - 6 = 0, 12x - 5y - 3 = 0 and 4x - 3y + 12 = 0. Find the internal bisector of the angle opposite to the side 3x + 4y - 6 = 0. **34.** A purchasing agent obtained samples of 60 watt bulbs from a standard company. He had the samples tested in his own laboratory for length of life with following results:

Length of life	More than				
	1700	1900	2100	2300	25000
Frequency	60	50	34	14	6

Find the standard deviation for these samples.



B. 9

C. 18

D. None of these

Answer: C

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2. If the latus rectum of an ellipse is equal to half of minor axis, then its eccentricity is (i) $\sqrt{\frac{3}{2}}$ (ii) $\frac{\sqrt{3}}{2}$ (iii) $\frac{1}{2}$ (iv) None of

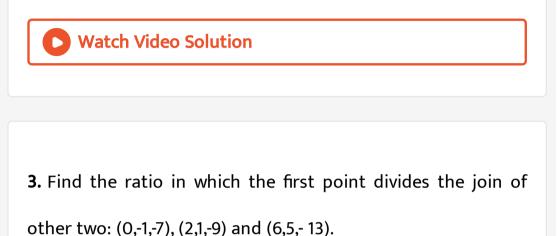
these

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

B. $\frac{\sqrt{3}}{2}$
C. $\frac{1}{2}$

D. None of these

Answer: B

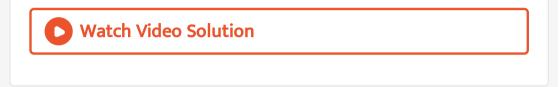


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4. Find the equation of the hyperbola whose vertices are

(\pm 3, 0) and foci at (\pm 5, 0)

5. Write the converse of the following statement: 'A positive integer is prime only if it has no divisors other that 1 and itself.'

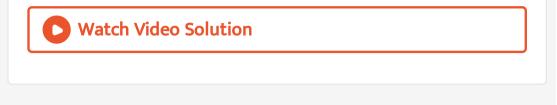


6. Write down the negation of following compound statement: |x| is equal to x or -x.

7. Prove by direct method that for any real numbers x, y if x=y,

then $x^2 = y^2$.

8. If the distance between the foci of a hyperbola is 16 and its eccentricity is $\sqrt{2}$, then obtain the equation of the hyperbola.



9. Find the equation of the parabola having focus at(-1,-2) and

directrix is x – 2y+3=0.



10. If the mid points of the sides of a triangle AB, BC and CA are D(1, 2, -3), E(3, 0, 1) and F(-1,1,-4), then find the centroid of the triangle.



1. For the given data, the calculation corresponding to all values of varsities (x, y) is following:

$$\Sigma(x-ar{x})^2 = 36, \Sigma(y-ar{y})^2 = 25, \Sigma(x-ar{x}), (y-ar{y}) = 20$$

Karl Pearson's correlation coefficient is

A. 0.66

B. - 0.66

C.-0.5

 $D.\,1.66$

Answer: a



2. The value of r in case of negative correlation lies in the interval

A. $(\propto , 0)$ B. $(- \propto , 0]$ C. [-1, 0)D. [-1, 0]

Answer: C

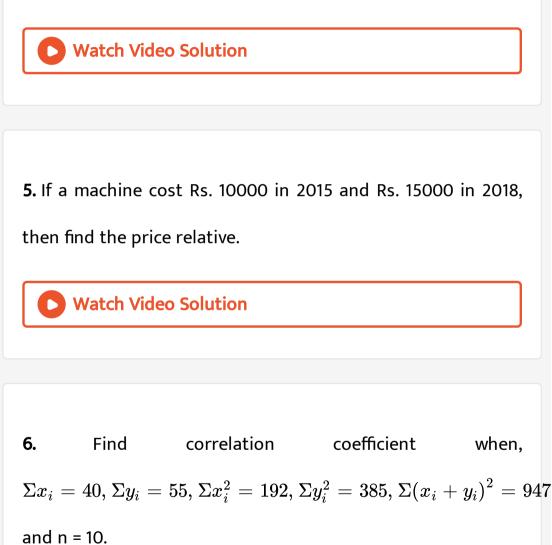


3. Find the coefficient of correlation, when Cov(x, y) = -16.5,

Var(x)= 100, Var(y)=2.89.



4. Calculate the index number for the total cost of the raw material uses, given $\Sigma \omega = 10$ and $\Sigma I \omega = 1173.61$.



7. Find out rank correlation form the following data:

S. No.	1	2	3	4	5	6	7	8	9	10
Rank differences	-2	-4	-1	3	2	0	-2	3	3	-2



8. From the following data calculate the percentage of

employees who earn more than Rs. 120.96 per day.

Daily wages (in ₹)	60-70	70 - 80	80 - 90	90 - 100	100-110	110 - 120	120-130
Number of workers		68	86	120	90	40	26

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9. The Daily sales figure of a particular brand of TV from 1^{st} April 2018 to 14^{th} April are as follows:



Calculate three-days moving averages and display these and

the original figures on the same graph.

