MATHS

BOOKS - S CHAND MATHS (ENGLISH)

MODEL TEST PAPER 14

Section A

1. The number of subsets of a set containing n elements is

    A. (a) 2^n

    B. (b) n^2

    C. (c) $2n$

    D. (d) n

Answer: A

Watch Video Solution

2. If $\tan x = \dfrac{3}{4}$ where $\pi < x < \dfrac{3\pi}{2}$, value of $\tan \dfrac{x}{2}$ is

A. 3

B. -3

C. $\dfrac{1}{3}$

D. $-\dfrac{1}{3}$

Answer: B

3. Value of $\sin\left(-\dfrac{11\pi}{3}\right)$ is

A. (a) $\dfrac{1}{2}$

B. (b) $-\dfrac{\sqrt{3}}{2}$

C. (c) $-\dfrac{1}{2}$

D. (d) $\dfrac{\sqrt{3}}{2}$

Answer: D

> ▶ Watch Video Solution

---

4. Let $A_1, A_2 \ldots \ldots, A_3$ be n arithmetic means between a and b. Then the common difference of the AP is

A. (a) $b - a$

B. (b) $a - b$

C. (c) $\dfrac{a - b}{n + 1}$

D. (d) $\dfrac{b - a}{n + 1}$

Answer: D

> ▶ Watch Video Solution

5. The quadratic equation whose one root is $-\dfrac{i}{4}$:

A. (a) $x^2 - \dfrac{1}{4} = 0$

B. (b) $x^2 + \dfrac{1}{4} = 0$

C. (c) $x^2 + \dfrac{1}{16} = 0$

D. (d) $x^2 + \dfrac{1}{8} = 0$

Answer: C

▶ Watch Video Solution

---

6. The distance between the complex numbers $2 + i$ and $-3 + 5i$ is

A. (a) $\sqrt{41}$

B. (b) $\sqrt{14}$

C. (c) $\sqrt{40}$

D. (d) 2

Answer: A

7. If $f(x) = \dfrac{x-1}{x+1}$, then

A. A. $f-\left(-\dfrac{1}{x}\right) = f(x)$

B. B. $f\left(-\dfrac{1}{x}\right) = \dfrac{1}{f(x)}$

C. C. $f\left(-\dfrac{1}{x}\right) = -f(x)$

D. D. $f\left(-\dfrac{1}{x}\right) = -\dfrac{1}{f(x)}$

Answer: D

8. The distance of the point (1,-1) from the line 12(x-6) = 5(y+2) is

A. (a) 5 units

B. (b) 25 units

C. (c) $\dfrac{5}{2}$ units

D. (d) $\dfrac{25}{4}$ units

Answer: A

▶ **Watch Video Solution**

---

9. $\displaystyle\lim_{x \to 0} \dfrac{\sin^2 2x}{\sin^2 4x}$ is equal to

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

B. $\dfrac{1}{4}$

C. $\dfrac{1}{8}$

D. $\dfrac{1}{16}$

Answer: B

▶ **Watch Video Solution**

10. The area of the circle passing through (-2,6) and having its centre at (1,2) is

A. 15π, sq.units
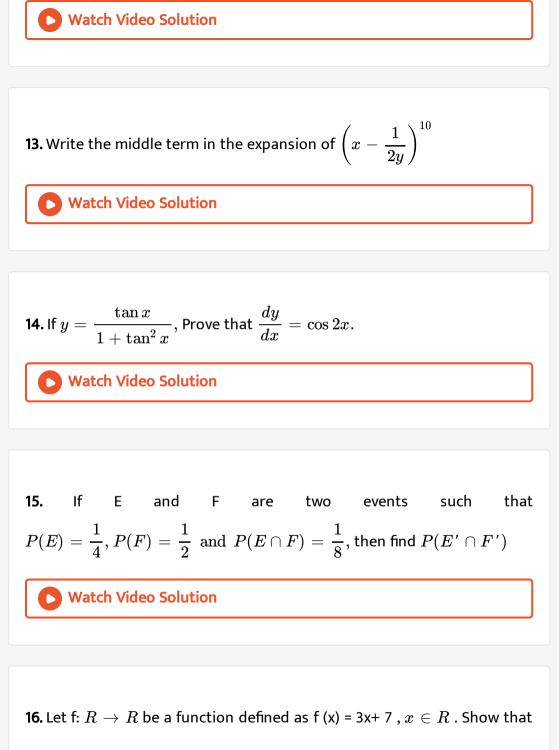
B. 12π, sq units

C. $14\pi sq.$ units

D. 25π, sq. units

Answer: D

▶ Watch Video Solution

11. Find the real numbers x,y such that $(iy + x)(3 + 2i) = 1 + i$

▶ Watch Video Solution

12. How many 4-digit numbers can be formed with the digits 9,8,7,5,3 when a digit may be repeated any number of times in any arrangement.

13. Write the middle term in the expansion of $\left(x - \dfrac{1}{2y} \right)^{10}$

14. If $y = \dfrac{\tan x}{1 + \tan^2 x}$, Prove that $\dfrac{dy}{dx} = \cos 2x$.

15. If E and F are two events such that $P(E) = \dfrac{1}{4}$, $P(F) = \dfrac{1}{2}$ and $P(E \cap F) = \dfrac{1}{8}$, then find $P(E' \cap F')$

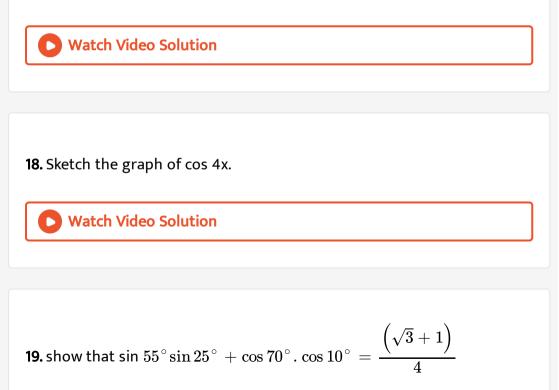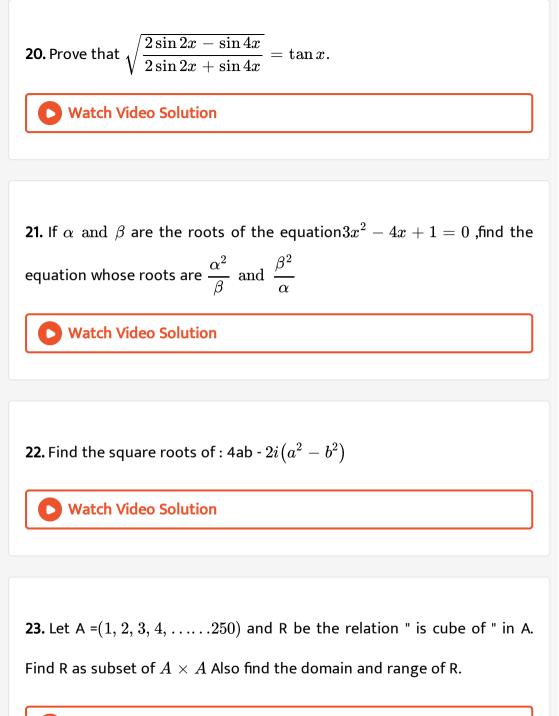**16.** Let f: $R \to R$ be a function defined as f (x) = 3x+ 7 , $x \in R$. Show that f is an onto functions.

17. In a certain examination , the number of candidates who appeared in the examination is 1000 out of which 650 appeared in English and 200 appeared in both English and Hindi . Find
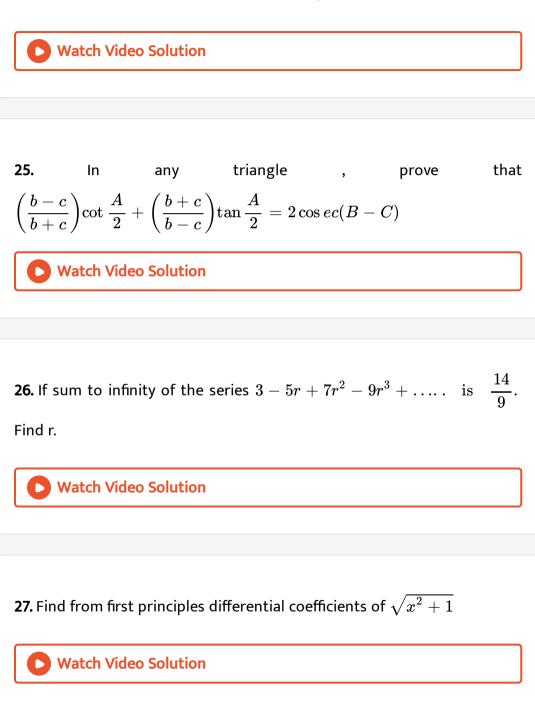
The number of candidates who offered paper in Hindi

(ii) The number of candidates who offered paper in English only.

18. Sketch the graph of cos 4x.

19. show that $\sin 55° \sin 25° + \cos 70° . \cos 10° = \dfrac{\left(\sqrt{3} + 1\right)}{4}$

20. Prove that $\sqrt{\dfrac{2\sin 2x - \sin 4x}{2\sin 2x + \sin 4x}} = \tan x.$

21. If α and β are the roots of the equation $3x^2 - 4x + 1 = 0$,find the equation whose roots are $\dfrac{\alpha^2}{\beta}$ and $\dfrac{\beta^2}{\alpha}$

22. Find the square roots of : 4ab - $2i\left(a^2 - b^2\right)$

23. Let A =$(1, 2, 3, 4, \ldots \ldots .250)$ and R be the relation " is cube of " in A. Find R as subset of $A \times A$ Also find the domain and range of R.

24. Prove that $\tan 9° - \tan 27° - \tan 63° + \tan 81° = 4$

25. In any triangle , prove that

$$\left(\frac{b-c}{b+c}\right)\cot\frac{A}{2} + \left(\frac{b+c}{b-c}\right)\tan\frac{A}{2} = 2\cos ec(B-C)$$

26. If sum to infinity of the series $3 - 5r + 7r^2 - 9r^3 + \dots$ is $\frac{14}{9}$.

Find r.

27. Find from first principles differential coefficients of $\sqrt{x^2 + 1}$

28. Evaluate : $\lim\limits_{x \to \infty} \dfrac{2x^2 + 7x + 5}{4x^2 + 3x - 1}$

29. Using mathematical induction, prove that

$$\frac{1}{1.3.5} + \frac{2}{3.5.7} + \dots + \frac{n}{(2n-1)(2n+1)(2n+3)} = \frac{n(n+1)}{2(2n+1)(2n+3)}$$

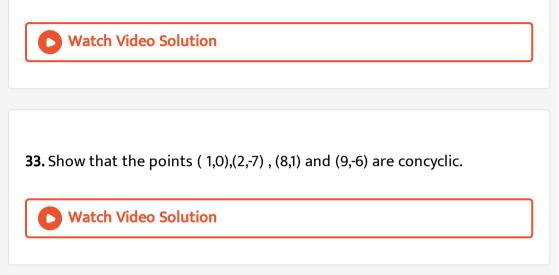**30.** Prove by using the principal of mathematical inductions

$$4 + 44 + 444 + \dots + 444\dots4(n \text{ digits }) = \frac{4}{81}\left(10^{n+1} - 9n - 10\right)$$

31. If A be the sum of odd terms and B be the sum of even terms in the expansion of $(x+a)^n$, prove that $A^2 - B^2 = \left(x^2 - a^2\right)^n$

32. The slope of a straight line through A(3,2) is $\frac{3}{4}$ .Find the coordinates of the points on the line that are 5 units away from it.

33. Show that the points (1,0),(2,-7) , (8,1) and (9,-6) are concyclic.

34. The batting scores of two cricket players A and B in 10 innings are as follows:

Batsman A	15	17	19	27	30	36	40	90	95	110
Batsman B	10	16	21	28	37	41	56	80	82	85

Which of the players is consistent.

1. Eccentricity of the conic $7y^2 - 9x^2 + 54x - 28y - 116 = 0$ is

A. $\dfrac{3}{2}$

B. $\dfrac{4}{3}$

C. $\dfrac{3}{4}$

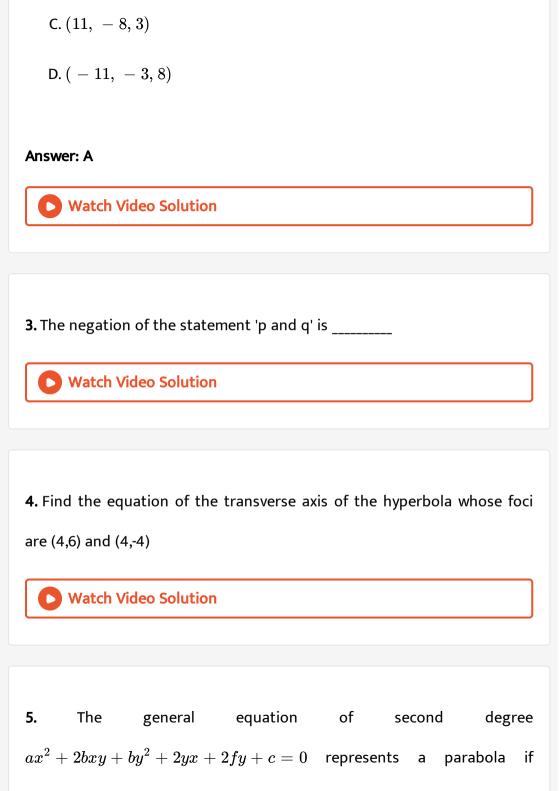D. None of these

Answer: B

▶ **Watch Video Solution**

2. If the line joining A(1,3,4) and B is divided by the point (-2,3,5) in the ratio 1:3 then the coordinates of B is

A. $(-11, 3, 8)$

B. $(-11, 8, 3)$

C. $(11, -8, 3)$

D. $(-11, -3, 8)$

Answer: A

> ▶ Watch Video Solution

3. The negation of the statement 'p and q' is _____

> ▶ Watch Video Solution

4. Find the equation of the transverse axis of the hyperbola whose foci are (4,6) and (4,-4)

> ▶ Watch Video Solution

5. The general equation of second degree $ax^2 + 2bxy + by^2 + 2yx + 2fy + c = 0$ represents a parabola if

$\Delta = abc + 2fgh - af^2 - bg^2 - ch^2 \neq 0$ and _____

6. Using truth table show that $-(p \lor q) \lor (\sim p \land q)$ is logically equivalent to $\sim p$.
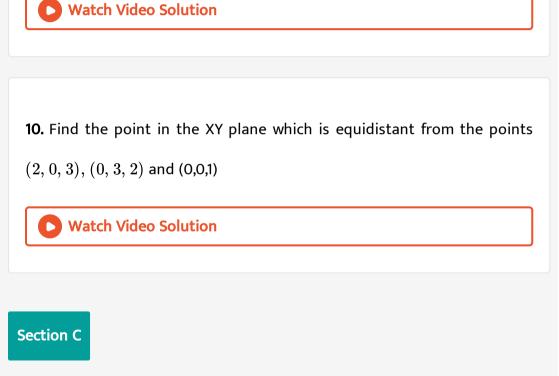
7. If S be a non - empty subset of R. Consider the following statement p . There is a rational number $x \in S$ such that $x > 0$.Write the negation of the statement p.

8. Show that the line $x - y + 4 = 0$ is tangent to the parabola $y^2 = 16x$. Find the point of contact.

9. Show that the line $3x + \sqrt{3}y = 12$ is a tangent to the ellipse $9x^2 + y^2 = 36$. Find the coordinates of the point of contact.

▶ Watch Video Solution

10. Find the point in the XY plane which is equidistant from the points $(2, 0, 3), (0, 3, 2)$ and $(0,0,1)$

▶ Watch Video Solution

Section C

1. The price index of a commodity is 225. The percentage increase in price of the commodity in current year as compared to base year is

A. 25 %

B. 225 %

C. 125 %

D. None of these

Answer: c

> ▶ **Watch Video Solution**

---

2. Given $\left|\vec{x_1}\right| = 47.5,\ \left|\vec{x_2}\right| = 52.5.$ and $\theta = 0$ Then $\left|\vec{x_1} - \vec{x_2}\right| =$

A. 27

B. 5

C. 23.7

D. 26.3

Answer: b

> ▶ **Watch Video Solution**

3. Which percentile equals D_7?

4. $P_{50} = D_5 = Q_K = $ Median , then value of k is ?

5. The Price relative and weight of a set of commoditities are given in the following table

Commodities	A	B	C	D
Weights	w_1	$3w_1$	w_2	$w_2 + 4$
Price relative	181	116	110	152

If the index for the set is 135 and the sum of the weight is 26, find $w_1 + w_2$

6. Find coefficient of quartile deviation for the following data.

Number	20	22	24	26	28	30	32
Frequency	4	5	8	8	7	4	4

▶ Watch Video Solution

7. The first of two samples has 100 times with mean 15 and standard deviations 3. If the whose group has 250 items with mean 15.6 and standard deviation $\sqrt{3.44}$ Find the standard deviation of the second group.

▶ Watch Video Solution

8. Calculate Karl Pearson's coefficient of correlations between the marks in Geography and History obtained by 8 students

Student Roll Number	1	2	3	4	5	6	7	8
Marks in Geography	20	13	18	21	11	12	17	16
Marks in History	17	12	22	24	20	21	18	10

▶ Watch Video Solution

9. The marks obtained in Mathematics and English are as follows.

Calculate Spearman's Coefficient of rank correlations.

Mathematics	43	40	46	42	48	38	36	49	35	41	45	30
English	29	31	20	19	27	41	31	30	25	38	36	29

▶ Watch Video Solution

10. In a typhoid epidemic ,the number of cases diagnosed were as follows.

Calculate 6 days moving average and display them and the original

figures on the same graph.

Date	1	2	3	4	5
Number of cases	2	0	5	12	20
Date	6	7	8	9	10
Number of cases	27	46	30	31	13
Date	11	12	13	14	
Number of cases	11	5	0	1	

▶ Watch Video Solution