MATHS

BOOKS - JEEVITH PUBLICATIONS MATHS (KANNADA ENGLISH)
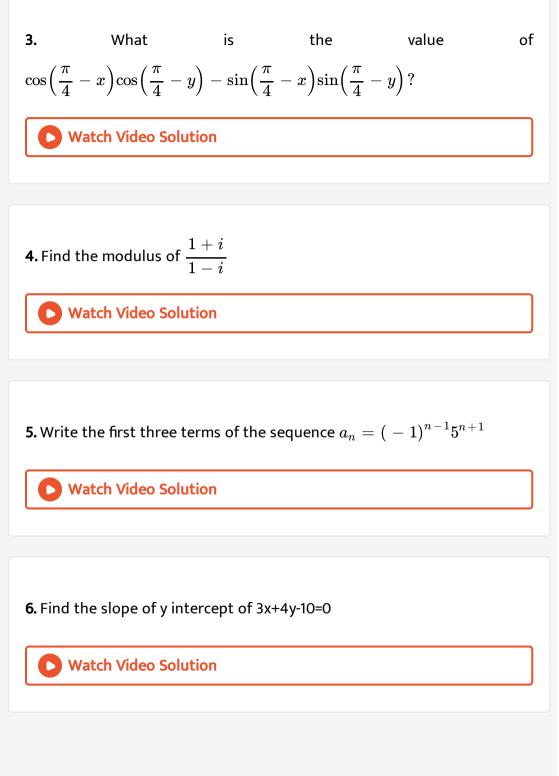
SUPER MODEL QUESTION PAPER-2
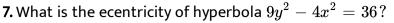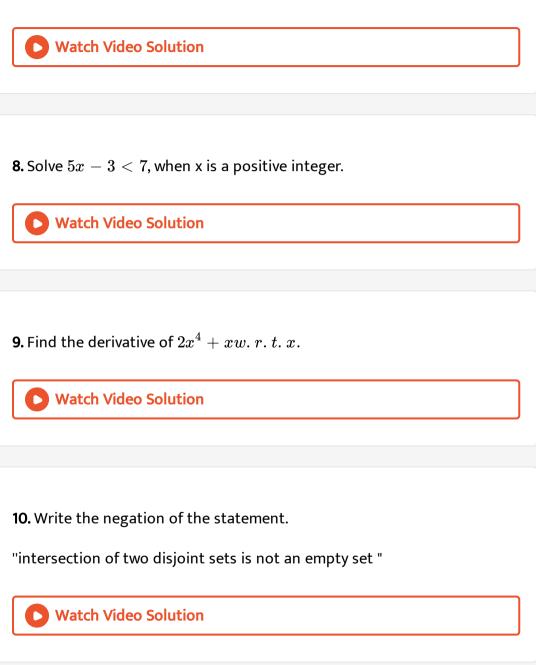
Part A

1. Write the power set of the set A={a,b}

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2. If (x - 1, y + 3) = (2, x + 4) Find the values of x and y .

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3. What is the value of

$$\cos\left(\frac{\pi}{4} - x\right)\cos\left(\frac{\pi}{4} - y\right) - \sin\left(\frac{\pi}{4} - x\right)\sin\left(\frac{\pi}{4} - y\right)?$$

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4. Find the modulus of $\dfrac{1+i}{1-i}$

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5. Write the first three terms of the sequence $a_n = (-1)^{n-1}5^{n+1}$

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6. Find the slope of y intercept of 3x+4y-10=0

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7. What is the ecentricity of hyperbola $9y^2 - 4x^2 = 36$?

8. Solve $5x - 3 < 7$, when x is a positive integer.

9. Find the derivative of $2x^4 + xw. r. t. x$.

10. Write the negation of the statement.

"intersection of two disjoint sets is not an empty set "

1.
If

$$U = \{x : x \leq 10, \text{x} \in N\} A = \{x : \text{x} \in N, x \text{ is prime}\} B = \{x : \text{x} \in N, x \text{ is}$$

write $A \cap B$ in roster form.

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2. If $A \times B = \{(a, 1)(a, 2)(a, 3)(b, 1)(b, 2)(b, 3)\}$ find the sets A and B

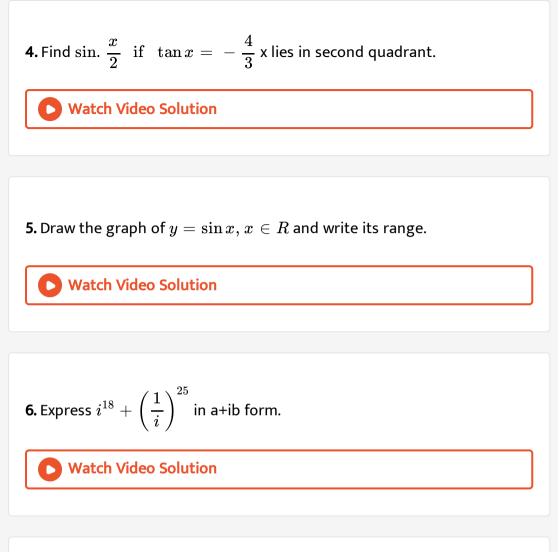and hence find $B \times A$.

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3. The difference btween two acute angles of a right angled triangle is

$3\dfrac{\pi}{10}$ radians. Express the angles in degrees.

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4. Find sin. $\dfrac{x}{2}$ if $\tan x = -\dfrac{4}{3}$ x lies in second quadrant.

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5. Draw the graph of $y = \sin x$, $x \in R$ and write its range.

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6. Express $i^{18} + \left(\dfrac{1}{i}\right)^{25}$ in a+ib form.

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7. Find the polar form of the complex number $\sqrt{3} + i$

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8. Find the roots of the equation $2x^2 + 10x + 20 = 0$

9. Find the number of ways of selecting 9 balls from 6 red balls, 5 white balls and 5 blue balls such that the selection consists of 3 balls of each colour.

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10. The sum of some terms of a G.P. is 315.The first term and the common ratio are 5 and 2 respectively,find the number of terms.

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11. In a triangle ABC with vertices $A(2, 3), B(4, -1)$ and $C(1, 2)$. Find the length of the altitude from the vertex A .

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12. Find k if the following lines are concurrent

$3x + y = 2,\ kx + 2y = 3$ and $2x - y = 3$

13. If the origin is the centroid of the triangle PQR with vertices $P(2a, 4, 6)Q(-4, 3b,\ -10)$ and $R(8, 14, 2c)$ then find the values of a , b , c .

14. Write the component statement of the following compound statement and check whether the given compound statement is true or false "0 is less than every positive integer and every negative integer.

Point C

1. Prove that there is no term involving x^4 in the expansion of $\left(\dfrac{x^2}{2} + \dfrac{1}{x}\right)^9$

2. The length of a rectangle is three times its breadth. If the minimum perimeter of the rectangle is 160cm, then find the minimum value of the breadth.

3. In a Survey of 5,000 people in town, 2250 were listed as reading English News paper 1750 as reading Hindi News Paper and 875 were listed as reading both Hindi or English news paper. Find how many people do not read Hindi or English News paper. Find how many people only English Nes Paper.

4. A relation 'R' is defined from a set A={2,3,4,5} to set B={3,6,7,10} as follows : $(x, y) \in R \Leftrightarrow x$ divides y. Express R as a set of ordered pairs and determine the domain and range of R.

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5. Let A={1,2,3,4}, B={1,5,9,11,15,16} and f={(1,5),(2,9),(3,1),(4,5),(2,11)}. Are the following true?

(i) f is a relation from A to B.

(ii) f is a function from A to B. Justify your answer in each case.

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6. Solve $\sin 2x - \sin 4x + \sin 6x = 0$

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7. If $\tan x = \dfrac{3}{4}$ and $\pi < x < \dfrac{3\pi}{2}$ find the values of $\sin 2x$ and $\cos 2x$

8. Convert the complex number $-\dfrac{16}{1 + i\sqrt{3}}$ into polar form.

9. Solve the following system of inequations in 2 variables graphically:

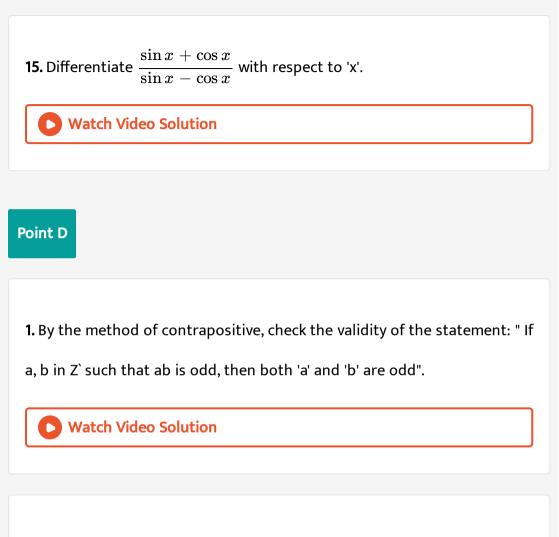$x + 2y \geq 20, \; 3x + y \leq 15$

10. Prove that ${}^{n}C_r + {}^{n}C_{r-1} = {}^{n+1}C_r.$

11. The sum of first three terms of a G.P is $\dfrac{39}{10}$ and their product is 1. Find the common ratio and the terms.

12. Find the coordinates of the foot of the perpendicular from the point (-1,3) to the line 3x-4y-16=0.

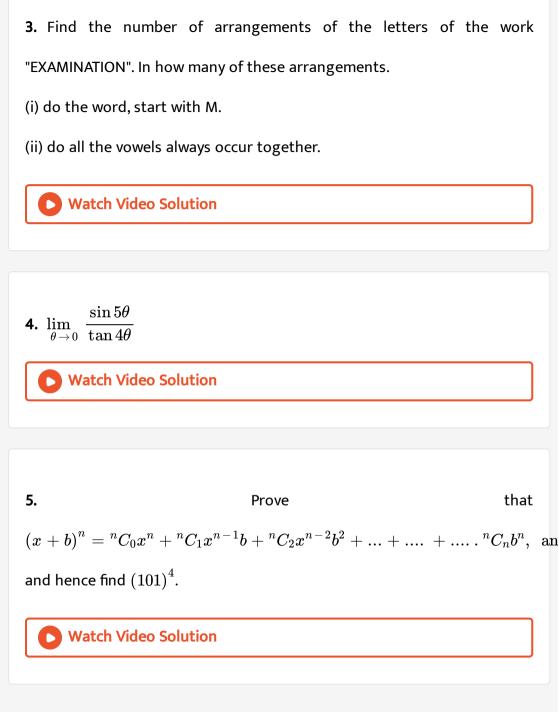**13.** Find the equation of the ellipse whose foci are at $(\pm 5, 0)$ and $5x = 36$ as on of its directrices.

14. Find the derivative of $f(x) = \dfrac{1}{x}$ w.r.t. 'x' from first principle.

15. Differentiate $\dfrac{\sin x + \cos x}{\sin x - \cos x}$ with respect to 'x'.

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Point D

1. By the method of contrapositive, check the validity of the statement: " If a, b in Z` such that ab is odd, then both 'a' and 'b' are odd".

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2. In a certain lottery 10,000 tickets are sold and 10 equal prizes are awarded. What is the probability of not getting a prize If you buy (a) one ticket (b) two tickets?

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3. Find the number of arrangements of the letters of the work "EXAMINATION". In how many of these arrangements.

(i) do the word, start with M.

(ii) do all the vowels always occur together.

4. $\lim\limits_{\theta \to 0} \dfrac{\sin 5\theta}{\tan 4\theta}$

5. Prove that

$$(x + b)^n = {}^nC_0 x^n + {}^nC_1 x^{n-1} b + {}^nC_2 x^{n-2} b^2 + \ldots + \ldots + \ldots . {}^nC_n b^n, \text{ an}$$

and hence find $(101)^4$.

6.

$$\frac{1}{1.2} + \frac{1}{2.3} + \frac{1}{3.4} + \ldots\ldots\ldots\ldots + \frac{1}{n(n+1)} = \frac{n}{n+1} \; \forall n \in N.$$

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7. Find the mean deviation about median for the following data.

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No. of girls	6	8	14	16	4	2

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8. Evaluate $\lim_{x \to 0} \; (\operatorname{cosec} \; x - \cot x).$

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Point E

1. Find the sum to n terms of the series , 5+11+19+29+41...

2. If p and q are the lengths of perpendicular from the origin to the lines $x \cos \theta - y \sin \theta = k \cos 2\theta$ and $x \sec \theta + y \mathrm{cosec}\theta = k$ respectively, prove that $p^2 + 4q^2 = k^2$.

3. Prove that $\dfrac{\sin 9x + \sin 7 + \sin 3x + \sin 5x}{\cos 9x + \cos 7x + \cos 3x + \cos 5x} = \tan 6x.$