



MATHS

BOOKS - JEEVITH PUBLICATIONS MATHS (KANNADA ENGLISH)

ANNUAL EXAMINATION QUESTION PAPER MARCH 2014 SOUTH

Part A

1. Write the $A = \{x : x \in R, 0 \leq x < 7\}$ as interval

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

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3. Convert $\left(\frac{5\pi}{3}\right)^e$ into degrees.

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4. Find the multiplicative inverse of $\sqrt{5} + 3i$

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5. Find the value of $\frac{8!}{6! \times 2!}$

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6. If the n th term of the sequence is $a_n = 4n - 3$ then find 17th term

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7. Find the equation of the line through the point (-2,3) and having the slope -4

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8. Evaluate $\lim_{x \rightarrow 0} \frac{\cos x}{\pi - x}$

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9. Write the negation of the statement "The number 2 is greater than 7"

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10. If $\frac{1}{2}$ is the probability of an event A, What is the probability of the event "not A"

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1. If X and Y are two sets such that $n(X) = 17, n(Y) = 23$, and $n(X \cup Y) = 38$ find $n(X \cap Y)$

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2. If $U = \{x : x \leq 10, x \in \mathbb{N}\}$, $A = \{x : x \in \mathbb{N}, x \text{ is prime}\}$, $B = \{x : x \in \mathbb{N}, x \text{ is even}\}$, write $A \cap B$ in roster form.

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3. Let $A = \{1, 2, 3, \dots, 14\}$. Define a relation R from A to A by $R = \{x, y\} : 3x - y = 0$ where $x, y \in A$. Write down its domain and range.

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4. Find the radius of the circle in which a central angle of 60° intercepts an arc of length 37.4 cm (use $\pi = \frac{22}{7}$)

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5. Prove that $\sin 2x = \frac{2 \tan x}{1 + \tan^2 x}$

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6. Express $1 + i\sqrt{3}$ in polar form

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7. Solve $\frac{5 - 2x}{3} \leq \frac{x}{6} - 10$

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8. Find the equation of the line parallel to the line $3x - 4y + 2 = 0$ and passing through the point $(-2, 3)$

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9. The line through the point $(h, 3)$ and $(4, 1)$ intersects the line $7x - 9y - 19 = 0$ at right angle Find the value of h .

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10. Verify that the points $(0, 7, 10)$, $(-1, 6, 6)$ and $(-4, 9, 6)$ are the vertices of an isosceles triangle

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11. Evaluate $\lim_{x \rightarrow 3} \frac{x^4 - 81}{2x^2 - 5x - 3}$

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12. Write the converse and contrapositive of the statement " If x is a prime number then x is odd "

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13. The coefficient of variation for a distribution is 60 and standard deviation is 21. Find the arithmetic mean.

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14. Three coins are tossed once. Find the probability of getting atleast two heads

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1. If $U = \{1, 2, 3, 4, 5, 6\}$ is the universal set, and $A = \{2, 3\}$, $B = \{3, 4, 5\}$, verify that

$$(A \cup B)^c = A^c \cap B^c$$

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2. Let $f = \{(1, 1), (2, 3), (0, -1), (-1, -3)\}$ be a function from Z to Z defined by $f(x) = ax + b$, for some integers a, b . Determine a, b .

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3. Prove that

$$\cos\left(\frac{3\pi}{2} + x\right) \cos(2\pi + x) \cdot \left[\cot\left(\frac{3\pi}{2} - x\right) + \cot(2\pi + x) \right] = 1$$

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4. Find the conjugate of $\frac{(3 - 2i)(2 + 3i)}{(1 + 2i)(2 - i)}$.

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5. Solve $x^2 + 3x + 9 = 0$

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6. In how many ways can the letters of the word PERMUTATIONS be arranged if (i) the words start P and end with S (ii) vowel are all together.

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7. Find the middle terms in the expansion $\left(3 - \frac{x^3}{6}\right)^6$

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

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9. In an A.P if m^{th} term is n and n^{th} term is m , where $m \neq n$, find the p^{th} term .

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10. Find the focus the equations of the directrix and the length of the rectum of the parabola $y^2 = 16x$

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11. Differentiate of $\sin x$ w.r.t. x from first principles

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12. Verify by the method of contradiction that $\sqrt{7}$ is irrational number

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13. A committee of two persons is selected from two men and two women. What is the probability that the committee will have (i) no man ? (ii) one man ? (iii) two men ?

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14. If E and F are two events such that $P(E) = \frac{1}{4}$, $P(F) = \frac{1}{2}$ and $P(E \text{ and } F) = \frac{1}{8}$. Find $P(\text{not } E \text{ and not } F)$

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Part D

1. Draw the graph of the signum function write its domain and range.

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2. Prove that $\cos^2 x + \cos^2\left(x + \frac{\pi}{3}\right) + \cos^2\left(x - \frac{\pi}{3}\right) = \frac{3}{2}$

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3. $1^2 + 2^2 + 3^2 + \dots + n^2 = \frac{n(n+1)(2n+1)}{6} \forall n \in N.$

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4. If $2n_{c_3} : n_{c_3} = 11 : 1$ find n Also find the value of n

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5. Derive the expression for the length of the perpendicular drawn from the point (x_1, y_1) to the line $ax + by + c = 0$

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6. Derive the section formula for the internal division in three dimensions.

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7. Prove that $\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$ (x being measured in radians)

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8. Solve the following system of inequalities graphically :

$$5x + 4y \leq 20, x \geq 1, y \geq 2$$

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9. (a) Derive geometrically that $\cos(x + y) = \cos x \cos y - \sin x \sin y$

.Hence deduce the value of $\cos 75^\circ$

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10. Find the sum to n terms of the series .

$$3 \times 1^2 + 5 \times 2^2 + 7 \times 3^2 + \dots$$



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11. Define hyperbola as a set of points derive its equation in the form

$$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$$



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12. If $f(x) = \frac{x^{100}}{100} + \frac{x^{99}}{99} + \frac{x^{98}}{98} \pm \dots \pm \frac{x^2}{2} + x + 1$ then prove that

$$f^1 = 100f^1(0)$$



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