MATHS

BOOKS - JEEVITH PUBLICATIONS MATHS (KANNADA ENGLISH)

ANNUAL EXAMINATION QUESTION PAPER MARCH 2013 NORTH

Part A

1. If U={ 1,2,3,4,5,6,7,8,9} is the universal set A ={ 2,4,6,8} then find the complement of A

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2. If (x+ y ,x-y}=(3,1) find the value of x and y

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3. Convert $\left(\dfrac{5\pi}{6}\right)^e$ into degrees.

4. Solve $5x - 7 > 4x + 9, x \in N$

5. Find n if $.^n C_{13} = .^n C_{12}$.

6. Find the 13th term of 1,4,7,10

7. Find the slope of the line $x - y + = 0$

8. Find the eccentricity of the elipse $\dfrac{x^2}{16} + \dfrac{y^2}{9} = 1$

9. Name the octant in which (1,-2,-3) lies

10. Given $f(x) = \begin{cases} \dfrac{x}{|x|} \\ 2 \\ x \neq 0 \\ x = 0 \end{cases}$ find $\displaystyle\lim_{x \to 0} f(x)$

11. Identify the type of 'or ' used in statement "$\sqrt{2}$ is a rational number or an irrational number

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

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Part B

1.

If $A = \{3, 5, 7, 9\}$, $B = \{5, 7, 9, 11\}$ and $C = \{13, 15\}$ find $A \cap (B \cup C$
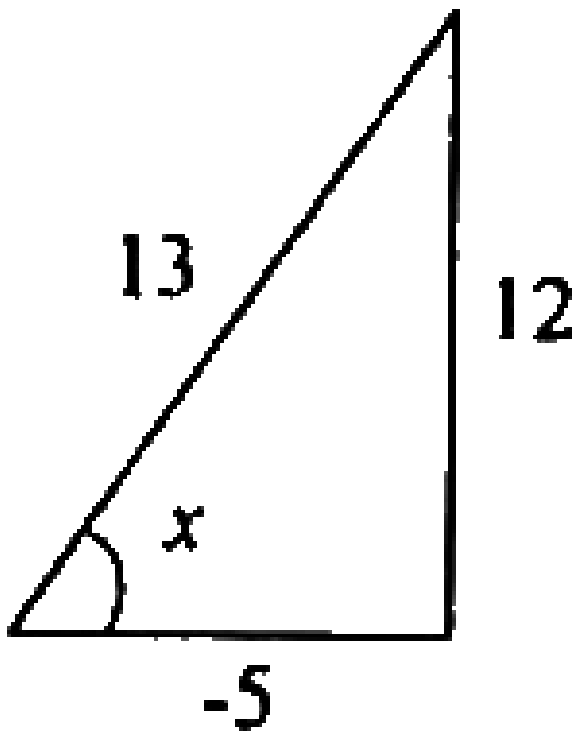
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2. Let A and B be two sets such that n (A) =3 and n(B) =2, If (x,1) ,(y ,2) (z,1) are in $A \times B$ find A and B where x,y,z, are distinct elements

3. The minute hand of a watch is 1.5 cm long. How far foes its tip move in 40 minutes?

4. If $\cot x = -\dfrac{5}{12}$, x lies in the second quadrant,find the values of secx and cosecx

5. solve $\tan 2x = -\cot\left(x + \dfrac{\pi}{3}\right)$

6. Let $Z_1 = 2 - I$ and $Z_2 = -2 + i$ Find the imaginary part of $\dfrac{1}{Z_1 Z_2}$

solve $= \sqrt{5}x^2 + x + \sqrt{5} = 0$

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7. Find all pairs of consecutive odd numbers, both of which are larger such that their sum is less than 40.

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8. In how many ways can the letters of the word 'PERMUTATIONS ' be arranged if the vowels are all together?

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9. Find r if $.^5 P_r = 2.^6 P_{r-1}$

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10. Find the middle term of $\left(x - \dfrac{1}{x} \right)^{16}$

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

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12. Derive the equation of the line passing through two points (x_1, y_1) and (x_2, y_2)

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13. If three points (h,0) ,(a,b) and (o,k) lie on a line,show that $\dfrac{a}{h} + \dfrac{b}{k} = 1$

14. Are the points A (3,6,9) ,B(10 ,20, 30 ,) and C(25,- 41, 5) the vertices of a right angled triangle?

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15. Identify the quantifier and write the negation of the statement "There exists a number which is equal to its square."

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Part C

1. In a class of 35 students, 24 like to play cricket and 16 to play football. Also each student like to play atleast one of the two games. How many students like to play both cricket and football ?

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2. Let A={1,2,3,4,6}. Let R be the relation on A defined by $\{\{a, b) : a, b \in A,$ b is exactly divisible by a}.

(i) Write R in roster form, (ii) Find the domain of R, (iii) Find the range of R.

3. Let $f(x) = x^2$, $g(x) = 2x + 1$ be two functions. Then find

(i) (f + g) (x) (ii) (f - g) (x) (iii) (fg) (x)

4. Prove that : $\sin 3x = 3 \sin x - 4 \sin^3 x$

5. $\cot x \cot 2x - \cot 2x \cot 3x - \cot 3x \cot x = 1$

6. The longest side of a triangle is 3 times the shortest side and the third side is 2 cm shorter than the longest side. If the perimeter of the triangle is at least 61 cm, find the minimum length of the shortest side.

7. (i) If $x - iy = \sqrt{\dfrac{a - ib}{c - id}}$ prove that $\left(x^2 + y^2\right) = \dfrac{a^2 + b^2}{c^2 + d^2}$

8. Convert $\dfrac{1 - i}{\cos \frac{\pi}{3} + i \sin \frac{\pi}{3}}$ into polar form

9. Find the coefficient of $x^6 y^3$ in the expansion of $(x + 2y)^9$

10. The sum of first three terms of a $G. P. is$ (13)/(12) `and their product is -1 Find the common ratio and the terms

11. Drive an expression for the distance between two parallel lines $y = mx + c_1$ and $y = mx + c_2$

12. Find the equation of a line perpendicular to the line $x - 2y + 3 = 0$ and passing through the point (1,-2)

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

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14. Evaluate $Lt_{x \to 0} \dfrac{\sqrt{1+x}-1}{x}$.

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15. Differentiate of $\cos x$ w.r.t. x from first principles

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16. Veryfy by the method of contradiction that $\sqrt{7}$ is an irrational

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17. A committee of two persons is selected from two men and two women.What is the probability that the committee will have (i) no men (ii)two men

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1. Prove that $\cos 6x = 32 \cos^6 x - 48 \cos^4 x + 18 \cos^2 x - 1$

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2. $1^3 + 2^3 + 3^3 + \ldots\ldots\ldots + n^3 = \dfrac{n^2(n+1)^2}{4} \ \forall n \in N.$

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3. A group consists of 7 boys and 5 girls . Find the number of ways in which a team of 5 members can be selected so as to have atleast one boy and girl.

4. Derive the equation of the ellipse in the form $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} = 1.$

5. Prove that $\displaystyle \lim_{x \to 0} \dfrac{\sin x}{x} = 1$ (x being measured in radians)

6. Find the mean deviation about the mean for the following data.

Marks obtained	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Number of students	2	3	8	14	8	3	2

7. Prove geometrically that $\cos(x + y) = \cos x \cos y + \sin x \sin y$

8. Find the sum to n terms of the series

$$1^2 + (1^2 + 2^2) + (1^2 + 2^2 + 3^2) + \dots .$$

9. Derive a formula for the angle between two lines with slopes m_1 and m_2. Hence the slopes of the lines which make an angle $\dfrac{\pi}{4}$ with the line $x - 2y + 5 = 0$

10. Find $\dfrac{dy}{dx}$ if y=x $\sin x - \dfrac{x^2}{13 + \tan x}$