MATHS –X 2006

1. Solve: $\dfrac{15}{u} + \dfrac{2}{v} = 17$: $\dfrac{1}{u} + \dfrac{1}{v} = \dfrac{36}{5}$

2. Find the values of a and b, if the HCF of the polynomials

   $f(x) = (x + 3)(2x^2 - 3x + a)$ and

   $g(x) = (x-2)(3x^2 + 10x - b)$ is $x^2 + x - 6$.

   Or

   The HCF & LCM of two polynomials

   p(x) and q(x) are $5(x^2 + 2x - 3)$ and $20 x (x^2-9)(x^2 - 3x+2)$

   respectively. If $p(x) = 10(x^2 - 9)(x - 1)$. Find q(x).

3. Reduce the following rational number to its lowest terms

   $$\dfrac{x^4 + x^2 + 1}{x^2 + x + 1}$$

   Or

   Simplify:

   $$\left(1 + \dfrac{x}{1-x}\right) \left(\dfrac{x}{1+x} - 1\right) \div \dfrac{1 + x^2}{1 - x^2}$$

4. Find the sum of the first 24 terms of the square whose n^{th} term is

   given by $a_n = 3 + \dfrac{2n}{3}$

   or

   $a_{10} - a_5 = 200$, find the common difference.

5. Find the A.P. whose 11th term is 5 and 18th term is 79.

6. An article is sold for Rs. 500 cash or for Rs. 150 cash down payment followed by 5 equal monthly installments. If the rate of interest charged is 18% p.a. compute the monthly installment.

7. A car is available for Rs.402200 cash or for Rs.150000 cash down payment and 3 equal half yearly installments. If the interest is charged at 10% per annum compounded half yearly, find the value of each installment.

8. In fig. BD $\perp$ AC and CE $\perp$ AB , Prove that AC X BD = AB x CE
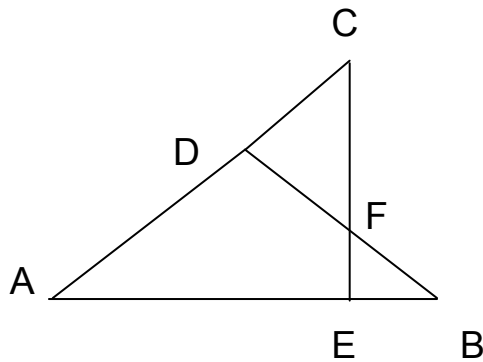
9. In fig. ABC and DBC are two similar triangles on the same base
   Prove that

$$\frac{ar \ (\Delta \ ABC)}{ar \ (\Delta \ DBC \ )} = \frac{A0}{D0}$$
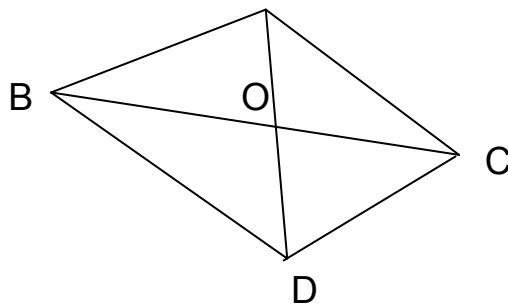
10. AB is a diameter and AC is a chord of a circle such that
    $\llcorner$ BAC $= 30$ ° The tangent at C intersects AB produced

in a point D. Prove that BC = BD

11. Solve Graphically:

  $2x - 3y = 5$; $3x + 4y + 1 = 0$

12. A motor boat whose speed is 9 km / hr in still water, goes 12 km, down stream and comes back in a total time of 3 hours. Find the speed of the stream .

Or

  Solve: $3y^2 + (6 + 4a)y + 8a = 0$

13. If $\sin 3\theta = \cos(\theta - 6°)$, find the value of θ .

14. 50 circular plates, each of radius 7 cm and thickness ½ cm are placed one above another to form a solid right circular cylinder. Find the total surface and the volume of the cylinder so formed.

15. Construct a cyclic quadrilateral ABCD where AB = 3 Cm, BC = 6 cm CA = 4 cm and AD =2 cm. Also , construct a quadrilateral similar to ABCD whose sides are 1.5 times the corresponding sides of ABCD.
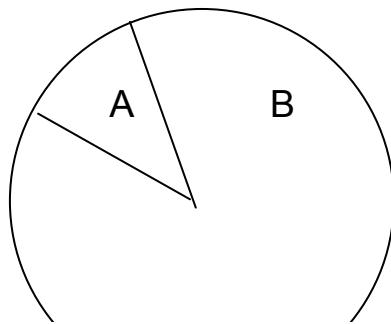
16. Find the mean (By Step deviation method)

C I	11-13	13-15	15-17	17-19	19-21	21-23	23-25
f	3	6	9	13	8	5	4

17. Cards marked with the numbers 2 to 101 are placed in a box and mixed   thoroughly. One card is drawn from this box. Find the probability of

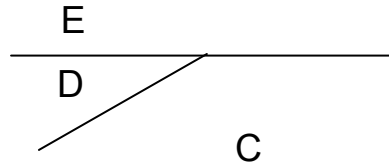(i)an even number (ii) a number which is a perfect cube.

18.

A – 45 ° - Foot Ball

B – 100 ° - Hocky

C - 160 ° - Cricket

D –   ?   - Basket Ball

E - 35 ° - Tennis

E

D

C

If the money spent on Foot ball is Rs. 9000, answer the following questions.

(i) What is the total amount spent on sports?

(ii) What is the amount spent on Basket Ball?

19. Find the ratio in which the line points (6,4) and (1, - 7) is divided internally by the axis of x .

20. Derive the distance formula (or) Section formula.

SECTION – C (5 x 6 = 30)

21. If a line is drawn parallel to one side of a triangle, prove that the other two sides are divided in the same ratio. Using the above result, prove that the diagonals of a trapezium divide each other in the same ratio.

22. If a line touches a circle and from the point of contact a chord is drawn, the angles which this chord makes with the given line are equal respectively to the angles formed in the corresponding alternate segments. Prove. Use this result to prove that the tangent at A to the circum circle of an isosceles $\triangle$ ABC, in which AB = BC is parallel to BC .