

Class: X

Subject : Mathematics

Assignment No. 3

**Quadratic equations :**

- Find the roots of the quadratic equation  $2x^2 - 7x + 3 = 0$  by  
(i) factorization (ii) formula (iii) completion of squares
- Solve for x :  
(i)  $\frac{1}{x+3} - \frac{1}{x-6} = \frac{9}{20}$  ;  $x \neq -3, 6$   
(ii)  $2\left(\frac{2x+3}{x-3}\right) - 25\left(\frac{x-3}{2x+3}\right) = 5$
- Find the values of k for which the following quadratic equations have equal roots :  
(i)  $2x^2 + kx + 3 = 0$  (ii)  $kx(x-2) = 0$
- The sum of the reciprocal of Rehman's age ( in years) 3 years ago and 5 years from now is  $\frac{1}{3}$ . Find his present age.
- A train travels 360 Km/hr at a uniform speed. If the speed has been 5 Km/hr more, it would have taken one hour less for the same journey. Find the speed of the train.

**Arithmetic Progression :**

- Find the 31<sup>st</sup> term of an AP whose 11<sup>th</sup> term is 38 and 16<sup>th</sup> term is 73.
- The first term of an AP is 5, the last term is 45 and the sum is 400. Find the number of terms and the common difference.
- Find the sum of the first 15 multiples of 8.
- In an AP , the sum of first n terms is  $\frac{3n^2}{2} + \frac{13n}{2}$ . Find its 25<sup>th</sup> term.
- The sum of the first five terms of an AP is 55 and the sum of the first ten terms of this AP is 235, find the sum of its first 20 terms.
- Find the sum of all two digit natural numbers which when divided by 3 yields 1 as remainder.

**Circle :**

- Prove that the tangents drawn at the ends of a chord of a circle make equal angles with the chord the circle 2.
- The length of a tangent from a point A at a distance 5cm from the centre of the circle is 4cm. Find the radius of the circle.
- Two concentric circles are of radii 5cm and 3cm. Find the length of the chord of the larger circle which touches the smaller circle.
- A circle is inscribed in a triangle ABC having sides AB = 12cm, BC = 8cm and CA = 10cm and touches the sides AB, BC and CA at D, E and F respectively. Find AD, BE and CF.
- A circle is touching the side BC of triangle ABC at P and touching AB and AC produced at Q and R respectively. Prove that  $PQ = \frac{1}{2}$  ( perimeter of triangle ABC).
- Prove that the opposite sides of a quadrilateral circumscribing a circle subtended supplementary at the centre of the circle.

**Constructions:**

1. Construct a triangle similar to a given triangle ABC with its sides equal to  $\frac{5}{3}$  of the corresponding sides of triangle ABC.
2. Draw a pair of tangents to a circle of radius 5cm which are inclined to each other at an angle of  $60^\circ$ .
3. AB is a line segment of length 10cm. Locate a point C on AB such that  $AC = \frac{1}{3} CB$ .

**Area related to Circles :**

1. Find the area of a quadrant of circle whose circumference is 22cm.
2. The race track is in the form of a ring whose inner circumference is 352m and outer circumference is 396m. Find the width of the track.
3. A wire when bent in the form of a square encloses an area of 1.96sq.cm. If the same wire is bent in the form of a circle, find the area of the circle.
4. A boy is cycling such that the wheels of the cycle are making 140 revolutions per minute. If the diameter of the wheel is 60cm, calculate the speed per hour which the boy is cycling.
5. A chord AB of a circle of radius 10cm makes a right angle at the centre of the circle. Find the area of the major and minor segments.

*Surface area and Volumes:*

1. The radii of the ends of a bucket 45 cm high are 28cm and 7cm, determine its capacity and surface area.
2. From a solid cylinder whose height is 2.4cm and diameter 1.4cm, a conical cavity of the same height and the same diameter is hollowed out. Find the total surface area of the remaining solid.
3. A cubical block of side 21cm is surmounted by a hemisphere. What is the greatest radius the hemisphere can have? Find the surface area of the solid.
4. Three cubes whose edges are in the ratio 3:4:5 are melted to form a single cube whose diagonal is  $15\sqrt{3}$  cm. Find the edges of three cubes.
5. A sphere of maximum volume is cut off from a solid hemisphere of radius 6cm. What is the volume of the cut-off sphere?
6. If the edge of a cube is increased by 50%, find the percentage increase in its total S.A. and Volume.

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