Directorate of Education
Govt. of NCT of Delhi

Practice Test Material
2015-2016

Subject : MATHEMATICS
Class : X

Under the guidance of :

Addl. DE (School/Exam)

PRACTICE TEST-1

CLASS: X

SUBJECT: MATHEMATICS

QUADRATIC EQUATIONS

Time : 50 min. **M.M. 20**

SECTION 'A'

1. Write the standard form of a quadratic equation.

2. Find the roots of the quadratic equation by factorization.

$$x^2 + 5x + 6 = 0$$

SECTION 'B'

3. If the sum and product of roots of the quadratic equation $ax^2 - 5x + c = 0$ are 10, then find the value of a and c.

4. Find the nature of the roots of $3x^2 - 2\sqrt{6} + 2 = 0$

SECTION 'C'

5. Solve for x :

$$\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$$

6. If one root of the quadratic equation $x^2 - 3x + q = 0$ is twice the other root, find the value of q.

7. Find the value of K, $2x^2 - 10x + K = 0$ the roots are equal and real.

8. Find the roots of the quadratic equation

   $x^2 - (\sqrt{3} + 1)x + \sqrt{3} = 0$ by the method of completing the square.

SECTION 'D'

9. Find two consecutive positive integers, sum of where square is 925.

10. The sum of two numbers is 10. If the sum of their reciprocals is $\frac{5}{8}$. Find the numbers.

11. If the list price of a book is reduced by Rs.2, a person can buy 2 books more for Rs. 360. Find the original price of book.

PRACTICE TEST-2

CLASS: X

SUBJECT: MATHEMATICS

ARITHMETIC PROGRESSIONS (A.P.)

Time : 50 min. **M.M. 20**

SECTION 'A'

1. Write the general form of an A.P. (Arithmetic Progression).

2. Write the sum of first ten natural numbers.

SECTION 'B'

3. Write first two terms of the A.P.

   $a = 12,\ d = -2$

4. Find the 7^{th} term of an A.P.

$$\sqrt{2}, \sqrt{8}, \sqrt{18}, \sqrt{32}, ...$$

SECTION 'C'

5. Find the sum of first five multiples of 7.

6. Write the sequence with n^{th} term $a_n = 5+3n$ find the sum of first seven terms.

7. Which term of the arithmetic progression 5, 15, 25, …. will be 130 more than its 31^{st} term?

8. How many terms of the series 54, 51, 48, … be taken so that, their sum is 513? Explain the double answer.

SECTION 'D'

9. The first term of an A.P. is 5, last term is 45 and the sum is 400. Find the number of terms and common difference.

10. The sum of the 5^{th} term and the 9^{th} term of an A.P. is 30. If its 25^{th} term is three times its 8^{th} term. Find the A.P.

11. If the sum of m terms of an A.P. is the same as the sum of its n terms, show that the sum of its (m+n) terms is zero.

PRACTICE TEST-3

CLASS: X

SUBJECT: MATHEMATICS

CIRCLE

Time : 50 min. **M.M. 20**

SECTION 'A'

1. The distance between two parallel tangents is 12cm. Find the radius of circle.

2. A quad. ABCD is drawn to circumscribe a circle. If AB=12cm, BC=15cm and CD=14cm, find the length of AD.

SECTION 'B'

3. AB is a diameter of circle and AC is a chord such that $\angle$BAC=30°. If the tangent at C intersects AB produced at D, prove that BC=BD.

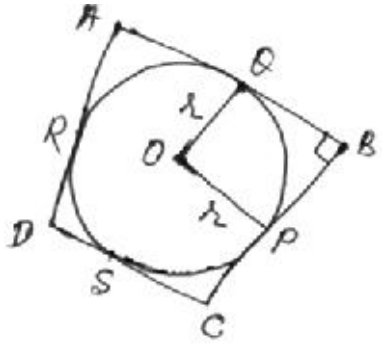
4. A tangent at point P of a circle of radius 5cm meets a line through the centre O at point Q so that OQ=13cm. Find the length PQ.

SECTION 'C'

5. ABC is an isosceles triangle in which AB=AC, circumscribed about a circle. Show that BC is bisected at the point of contact.

6. PQR is a right angled triangle, $\angle$Q = 90°, PQ = 5cm, QR = 12cm. A circle with centre O is inscribed in ΔPQR touching its all sides, find the radius of circle.

7. A circle is inscribed in quad. ABCD in which $\angle$B=90° If AD = 23cm, AB=29cm and DS=5cm, find the radius of circle.

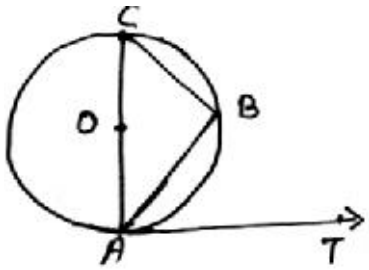


8. Two circles touch each other at C. AB and CD are two common tangents to the circle. If D lies on AB such that CD=6cm, then find AB.

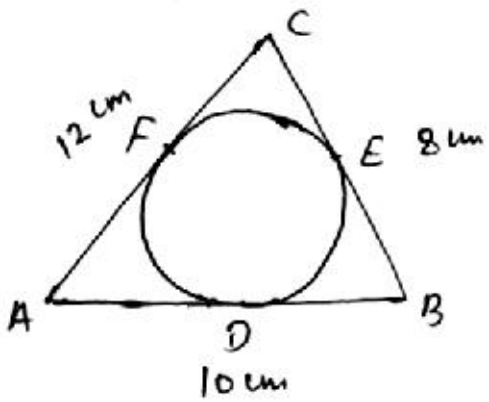
SECTION 'D'

9. PA and PB are two tangents drawn from an external point P to a circle with centre O and radius 'a'. If $\angle$APB=60°, then prove that $AP = a\sqrt{3}$.

10. If AB is a chord of a circle with centre O, AOC is a diameter at AT is the tangent at A, as shown in figure, prove that $\angle BAT = \angle ACB$.



11. A circle is inscribed in ΔABC having sides 8 cm, 10cm and 12cm as shown in figure. Find AD, BE and CF.



PRACTICE TEST-4

CLASS: X

SUBJECT: MATHEMATICS

CONSTRUCTIONS

Time : 50 min. **M.M. 20**

SECTION 'A'

1. Is construction of a triangle with sides 8cm, 4cm, 4cm possible?

2. What should be the difference of AB and AC for the construction of right ΔABC, with BC=4.0cm, $\angle C=60°$?

SECTION 'B'

3. Draw a line segment of length 7.2cm. Divide the line segment into two parts in the ratio 2:3.

4. A line segment AB is divided by a point P into ratio 3:4. If AP=1.2cm, find the length of AB.

SECTION 'C'

5. Construct an isosceles triangle whose base is 7cm and altitude is 4.5cm, then draw another triangle whose sides are 3/2 times the corresponding sides of given triangle.

6. Draw a ΔABC with BC=6.5cm, $\angle B=45°$, $\angle A=75°$, then construct another triangle whose sides are 3/4 times the corresponding sides of ΔABC.

7. Draw a circle of radius 3.5cm. Draw tangents to the circle from a point which is 6cm away from the centre of circle. Measure the length of each tangent.

8. Draw a circle of radius 4cm. Draw a pair of tangents to the circle which are inclined to each other at an angle of 45°.

SECTION 'D'

9. Draw a circle of radius 4cm. Take a point P such that OP=10cm. Draw perpendicular bisector of OP. Take a point M, 3.5cm away from the mid point of OP on the perpendicular bisector of OP. Draw tangents to the circle from M.

10. Construct an equilateral ΔABC, in which altitude drawn from opposite vertex is 4cm. Also construct a ΔAPR similar to ΔABC such that each side of ΔAPR is 1.5t times that of the corresponding sides of ΔABC.

11. Draw a circle of radius 4.2cm. Take points P and Q on extended diameter each at a distance 7cm from its centre. Draw tangents to the circle from these two points P and Q.

PRACTICE TEST-5

CLASS: X

SUBJECT: MATHEMATICS

APPLICATIONS OF TRIGONOMETRY

Time : 50 min. **M.M. 20**

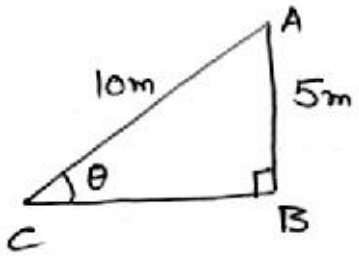
SECTION 'A'

1. What will be the angle of elevation if the length of shadow of pole equals to its height?

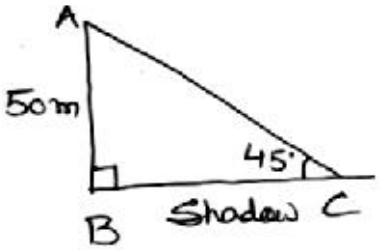
2. Find sun's elevation if a pole 6m high casts a shadow $2\sqrt{3}$m.

SECTION 'B'

3. Find θ and BC.

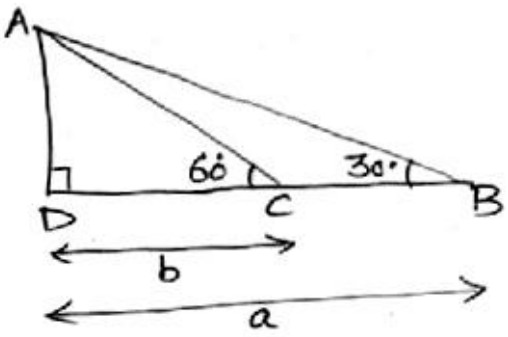


4. Find $\angle A$ and AC.

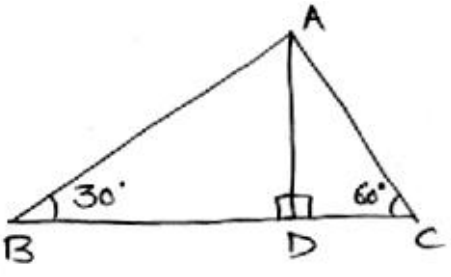


SECTION 'C'

5. Find height of tower AB in terms of a and b.

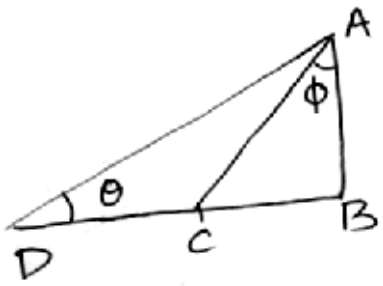


6. If AD = $7\sqrt{3}$m, then find BC.



7. If the ratio of the height of a pole and length of its shadow is $\sqrt{3}:1$. What is the angle of elevation of the sun?

8. In the given figure, what is the angle of elevation of point A and C and angle of depression of point D from A?



SECTION 'D'

9. A spherical balloon of radius r subtends an angle α at the eye of an observer. If the angle of elevation of its centre is β. Find the height of the centre of the balloon (in terms of r).

10. From a balloon vertically above a straight road, the angles of depression of two cars at an instant are found to be 45° and 60°. If cars are 100m apart, find the height of the balloon.

PRACTICE TEST-6

CLASS: X

SUBJECT: MATHEMATICS

COORDINATE GEOMETRY

Time : 50 min. **M.M. 20**

SECTION 'A'

1. Find the distance between the points A (2a, 6a) and $B(2a+\sqrt{3}a,5a)$.

2. Find the fourth vertex of the rectangle whose three vertices are (4,1) (7,4) and (13,–2) [Taken in order].

SECTION 'B'

3. Find the point an y-axis which is equidistant from the points A (5,–2) and B(–3,2).

4. Find the length of median AD of ΔABC having vertices A (5,1), B (1,5) and C(–3.–1).

SECTION 'C'

5. Find the area of rhombus whose vertices taken in order are (3,0), (4,5), (–1,4), (–2,–1).

6. If the points A(–2,1), B(a,b) and C(4,–1) are collinear and a–b=1, find the value of a & b.

7. Find the ratio in which the segment joining A(1,–5) and B(–4,5) is divided by x-axis. Also find the coordinates of the points of division.

8. Prove that the points (3,2), (0,5), (–3,2) and (0,–1). Also find the coordinates of the points of division.

SECTION 'D'

9. If (0,4) and (0,–4) are the vertices of equilateral triangle, find the coordinates of its third vertex. Also find its area.

10. The line segment joining the points A(2,1) and B(5,–8) is trisected at the point P and Q such that point P is nearer to A. If point P lies on the line 2x–y+k=0. find the value of K.

11. In ΔABC, D, E and F are the mid points of the sides BC, CA and AB respectively, using coordinate geometry prove that :

$$\text{ar } \Delta DEF = \frac{1}{4} \text{ ar } \Delta ABC$$

PRACTICE TEST-7

CLASS: X

SUBJECT: MATHEMATICS

PROBABILITY

Time : 50 min. **M.M. 20**

SECTION 'A'

1. A dice is thrown once. Find the probability of getting a prime number.
2. A bag contains 3 red, 7 white and 4 black balls. A ball is drawn at random. What is the probability that the ball drawn is not red?

SECTION 'B'

3. Two dice are thrown together. Find the probability that the product of numbers on the top of dice are (i) 6 (ii) 12.
4. A coin is tossed twice. Find the probability of getting (i) at least one head (ii) at most one head.

SECTION 'C'

5. A car is drawn at random from a well shuffled deck of playing cards. Find the probability that the card drawn is (i) a king or jack (ii) a non-Ace (iii) a red card
6. Renu and Riju are friends. What is the probability that both will have :

   (i) different birthdays (ii) same birthday (iii) ignoring leap year
7. A jar contains 24 marbles, some are green and others are blue. If a marble is drawn at random from the jar, the probability that it is green is $\frac{1}{3}$. Find the number of balls of each type.
8. A box contains 72 cards which are numbered from 1 to 72. If one card is drawn at random find the probability that it bears

   (i) a two digit number (ii) a perfect square number (iii) a number divisible by 5

SECTION 'D'

9. A box contains 24 balls out of which x are black if one ball is drawn at random from the box what is the probability that it will be a black ball?

   If 12 more black balls are put in the box, the probability of drawing a black ball is now double of what it was before. Find x.
10. One card is drawn from peek of 52 cards. Find the probability that the card drawn is :

    (i) either red or king (ii) red and a king (iii) '10' of a black suit (iv) a black face card
11. A die is thrown twice. What is the probability that

    (i) 5 will not come up either time (ii) 5 will come up at least once.

PRACTICE TEST-8

CLASS: X

SUBJECT: MATHEMATICS

AREAS RELATED TO CIRCLES

Time : 50 min. **M.M. 20**

SECTION 'A'

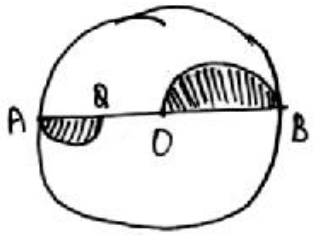
1. If the perimeter of a semi-circular protactor is 72cm, where $\pi = \frac{22}{7}$, then find the diameter of the protactor.
2. What is the area of the circle that can be inscribed in a square of side 6cm?

SECTION 'B'

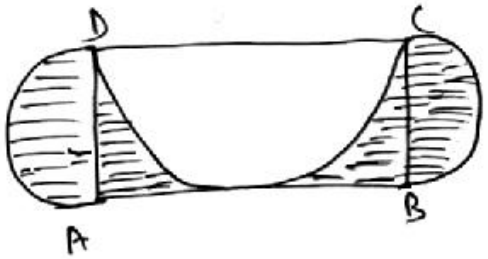
3. A road which is 7m wide surrounds a circular pack whose circumference is 352m. Find the area of the road.
4. Find the area of a quadrant of a circle whose circumference is 616cm.

SECTION 'C'

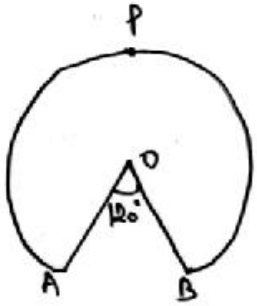
5. Find the area of the shaded region, if the diameter of the circle with centre O is 28 cm and $AQ = \frac{1}{4}AB$. $\left(\text{use}\,\pi = \frac{22}{7}\right)$



6. In the given figure ABCD is a rectangle with AB = 14 cm and BC = 7 cm, taking DC, BC and AD as diameter, three semi-circles are drawn. Find the area of the shaded region.



7. In the given figure, OAPB is a sector of a circle of radius 3.5cm with the centre at O and $\angle AOB = 120°$. Find the length of OAPBO.



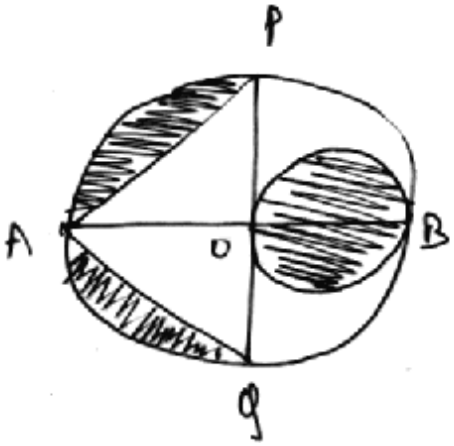
8. The area of an equilateral triangle is $49\sqrt{3}\text{cm}^2$. Taking each vertex as centre, circles are described with radius equal to half the length of the side of the triangle. Find the area of the part of the triangle not included in the circles. $\left(\text{Take } \sqrt{3} = 1.73, \pi = \frac{22}{7}\right)$

SECTION 'D'

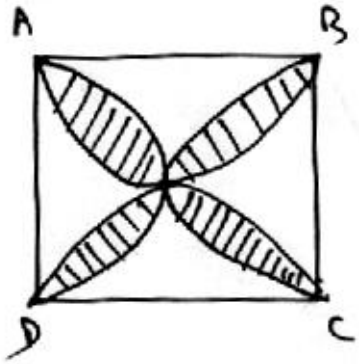
9. The diameter of front and rear wheels of a tractor are 80cm and 2m respectively. Find the number of revolutions that rear wheel will make in covering a distance in which the front wheel makes 1400 revolutions.

10. In figure, AB&PQ are perpendicular diameters of the circle whose centre is 0 and radius OA = 7cm. Find the area of shaded region.

Find the area of shaded region $\left[\text{Use } \pi = \frac{22}{7}\right]$



11. Find the area of the shaded design in figure, where ABCD is a square of side 10cm and semicircles are drawn with each side of the square as diameter. (use π = 3.14).



PRACTICE TEST-9

CLASS: X

SUBJECT: MATHEMATICS

SURFACE AREAS AND VOLUMES

Time : 50 min. **M.M. 20**

SECTION 'A'

1. If the area of three adjacent faces of a cuboid are X, Y and Z respectively, then find the volume of the cuboid.
2. The slant height of a bucket is 26cm. The diameter of upper and lower circular ends are 36cm and 16cm. Find the height of the bucket.

SECTION 'B'

3. Three cubes each of volume $125cm^3$ are joined end to end. Find the surface area of the resulting cuboid.
4. A cylinder whose height is two third of its diameter has the same volume as a sphere of radius 4cm. Calculate the radius of base of cylinder.

SECTION 'C'

5. If the radii of the ends of a bucket 24cm high are 5cm and 15cm, find the surface area of the bucket.
6. A hemispherical tank full of water is emptied by a pipe at the rate of 3¼ litres per second. How much time will it take to empty half the tank, if it is in 3m in diameter? $\left(\text{use } \pi = \frac{22}{7}\right)$
7. From a solid cylinder whose height is 7cm and radius 6cm, a conical cavity of height 7cm and base radius 6cm is taken out. Find the volume of the remaining solid?
8. A circus tent is cylindrical upto a height of 3m and conical above it. If the diameter of the base is 105m and the slant height of the conical part is 53m, find the canvas used in making the tent.

SECTION 'D'

9. A right triangle with sides 3cm and 4cm is revolved around its hypotenuse. Find the volume of double cone thus generated. (Use $\pi = 3.14$)
10. A cone of radius 10cm is divided into two parts by drawing a plane through the mid point of its axis, parallel to its base. Compare the volumes of two parts.
11. A solid right circular cylinder has a total surface area 462 sq.cm. If its curved surface area is one-third of the total surface area, find the volume of the cylinder $\left(\text{Use } \pi = \frac{22}{7}\right)$

PRACTICE TEST-10

CLASS: X

SUBJECT: MATHEMATICS

SURFACE AREAS AND VOLUMES

Time : 50 min. **M.M. 20**

SECTION 'A'

1. If A_1, A_2 and A_3 denote the areas of three adjacent faces of a cuboid, then find its volume.
2. The height' of a cylinder equals to the circumference of the cylinder. Find the volume of the cylinder in terms of h?

SECTION 'B'

3. Find the volume of a sphere whose surface area is 154 sq.cm.
4. The diameter of a garden roller is 1.4m and it is 2m long. How much area will it cover in 5 revolutions? $\left(\text{Use } \pi = \frac{22}{7}\right)$

SECTION 'C'

5. The surface area of a sphere is 5544m^2, find its diameter?
6. The circumference of the base of a 10m high conical tent is 44m. Calculate the length of canvas used in making the tent if width of canvas is 2m $\left(\text{Use } \pi = \frac{22}{7}\right)$
7. A solid cylinder has total surface area of 462 cm^2. Its curved surface area is one-third of its total surface area. Find the volume of the cylinder $\left(\text{Use } \pi = \frac{22}{7}\right)$
8. The outer dimensions of a closed wooden box are 10cm by 8cm by 7cm. Thickness of the wood is 1cm. Find the total cost of wood required to make box if 1cm^3 of wood costs Rs. 2.00.

SECTION 'D'

9. A cone of height 24cm has a curved surface area 550 cm? Find its volume $\left(\text{take } \pi = \frac{22}{7}\right)$
10. A well with 10m inside diameter is dug8.4m deep. Earth taken out of it is spread all around it to a width of 7.5m to form an embankment. Find the height of the embankment?
11. A room is one and half as long as it is broad. The cost of carpeting the room at Rs. 3.25 per m^2 is Rs. 175.50 and the cost of papering the walls at Rs. 1.40 per m^2 is Rs. 240.80. If 1 door and 2 windows occupy 8m^2, find the dimension of the room.