SAMPLE PAPER 1

Class 10 - Mathematics

Time Allowed: 3 hours **Maximum Marks: 80**

General Instructions:

1. This Question Paper has 5 Sections A, B, C, D and E.
2. Section A has 20 MCQs carrying 1 mark each
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment (04 marks each) with sub- parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2marks questions of Section E
8. Draw neat figures wherever required. Take $\pi = \frac{22}{7}$ wherever required if not stated.

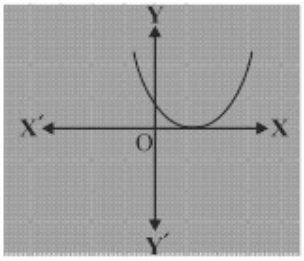
Section A

1. HCF of $(2^3 \times 3^2 \times 5)$, $(2^2 \times 3^3 \times 5^2)$ and $(2^4 \times 3 \times 5^3 \times 7)$ is **[1]**

   a) 60 b) 48

   c) 30 d) 105

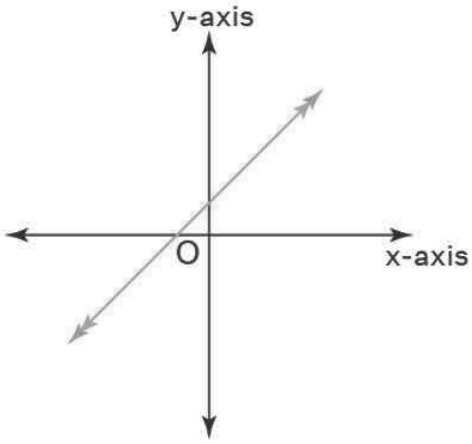
2. Find the number of zeroes of p(x) in the figure given below. **[1]**



   a) 3 b) 1

   c) 2 d) 0

3. The number of solutions of two linear equations representing coincident lines is/are **[1]**



a) infinite solution
b) 0
c) 1
d) 5

4. By a reduction of Re.1 per kg in the price of sugar, Radha can buy one kg sugar more for Rs.56. The original price of 1 kg of sugar is **[1]**

a) Rs.8
b) Rs.7
c) Rs.9
d) Rs.6

5. The sum of first 20 odd natural numbers is **[1]**

a) 400
b) 420
c) 100
d) 210

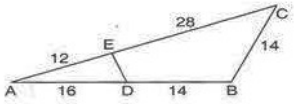
6. If the coordinates of a point are (-5, 11), then its abscissa is **[1]**

a) -5
b) 11
c) 5
d) -11

7. If the midpoint of the line segment joining the points (a, b - 2) and (-2, 4) is (2, -3), then the values of a and b are **[1]**

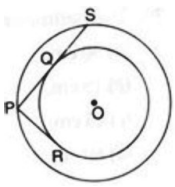
a) 6, 8
b) 6, -8
c) 4, -5
d) -6, 8

8. In the given figure if $\Delta AED \sim \Delta ABC$, then DE is equal to **[1]**



a) 6.5 cm
b) 5.6 cm
c) 5.5 cm
d) 7.5 cm

9. The given figure shows two concentric circles with centre O. PR and PQS are tangents to the inner circle from point P lying on the outer circle. If PR = 7.5 cm, then PS is equal to **[1]**



a) 10 cm.
b) 18 cm.

c) 12 cm. d) 15 cm.

10. To draw a pair of tangents to a circle, which are inclined to each other at an angle of 45°, we have to draw tangents at the endpoints of those two radii, the angle between which is **[1]**

a) 135° b) 145°

c) 105° d) 140°

11. (sec A + tan A) (1 – sin A) **[1]**

a) cos A b) sec A

c) sin A d) cosec A

12. If a cos θ + b sin θ = m and a sin θ - b cos θ = n, then $a^2 + b^2$ = **[1]**

a) $n^2 - m^2$ b) $m^2 + n^2$

c) $m^2 - n^2$ d) m^2n^2

13. The shadow of a 5 m long stick is 2 m long. At the same time, the length of the shadow of a 12.5 m high tree is **[1]**

a) 3 m b) 4.5 m

c) 3.5 m d) 5 m

14. If a chord of a circle of radius 28 cm makes an angle of 90^o at the centre, then the area of the major segment is **[1]**

a) 1456 cm^2 b) 1848 cm^2

c) 392 cm^2 d) 2240 cm^2

15. If the area of a sector of a circle is $\frac{5}{18}$ of the area of the circle, then the sector angle is equal to **[1]**

a) 100° b) 120°

c) 90° d) 60°

16. If the probability of winning a game is 0.4 then the probability of losing it, is **[1]**

a) None of these b) 0.6

c) 0.4 d) 0.96

17. If a digit is chosen at random from the digits 1, 2, 3, 4, 5, 6, 7, 8, 9, then the probability that it is odd, is **[1]**

a) $\frac{4}{9}$ b) $\frac{1}{9}$

c) $\frac{5}{9}$ d) $\frac{2}{3}$

18. The arithmetic mean of 1, 2, 3, 4, ..., n is: **[1]**

a) $\frac{n-1}{2}$ b) $\frac{n(n+1)}{2}$

c) $\frac{n}{2}$ d) $\frac{n+1}{2}$

19. **Assertion (A):** Two identical solid cubes of side a are joined end to end. Then the total surface area of the resulting cuboid is 10 a^2. **[1]**

Reason (R): The total surface area of a cube having side a = 6 a^2.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

20. **Assertion (A):** The sum of series with the nth term t_n = (9 - 5n) is 220 when no. of terms n = 6. **[1]**

Reason (R): Sum of first n terms in an A.P. is given by the formula: Sn = 2 n × [2a + (n - 1)d]

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

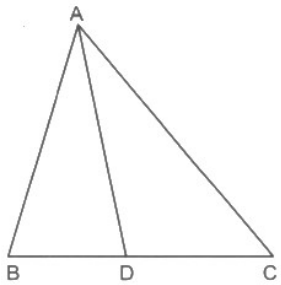
c) A is true but R is false.

d) A is false but R is true.

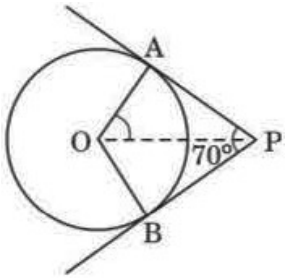
Section B

21. Can two numbers have 15 as their HCF and 175 as their LCM ? Give reasons. **[2]**

22. In Fig. check whether AD is the bisector of $\angle A$ of ΔABC if AB =6 cm, AC = 8 cm, BD = 1.5 cm and CD = 2 cm **[2]**



23. In Figure, if tangents PA and PB drawn from a point P to a circle with centre O, are inclined to each other at an angle of 70^o, then find the measure of ∠POA. **[2]**



24. If x = 30^o, verify that $\cos 3x = 4\cos^3 x - 3\cos x$. **[2]**

OR

Using the formula, $\cos A = \sqrt{\frac{1-\cos 2A}{2}}$ find the value of cos 30°, it being given that cos 60° = $\frac{1}{2}$

25. The areas of two sectors of two different circles are equal. Is it necessary that their corresponding arc lengths are equal? Why? **[2]**

OR

A sector of 56°, cut out from a circle, contains 17.6 cm^2. Find the radius of the circle.

Section C

26. In a school there are two sections, namely A and B, of class X. There are 30 students in section A and 28 students in section B. Find the minimum number of books required for their class library so that they can be distributed equally among students of section A or section B. **[3]**

27. Verify that 5,-2 and $\frac{1}{3}$ are the zeros of the cubic polynomial $p(x) = 3x^3 - 10x^2 - 27x + 10$ and verify the relation between its zeros and coefficients. **[3]**

28. A jeweller has bars of 18-carat gold and 12-carat gold. How much of each must be melted together to obtain a bar of 16-carat gold, weighing 120 g? (Given: Pure gold is 24-carat). **[3]**

OR

Solve the system of equations by using the method of substitution:

$\frac{2x}{a} + \frac{y}{b} = 2$

$\frac{x}{a} - \frac{y}{b} = 4$

29. A point P is 26 cm from the centre of the circle. The length of the tangent drawn from P to the circle is 24 cm. Find the radius of the circle. **[3]**

OR

ABC is a right-angled triangle, right angled at A. A circle is inscribed in it. The lengths of two sides containing the right angle are 24 cm and 10 cm. Find the radius of the incircle.

30. In a $\triangle$ABC, $\angle$B = 90°, AB = 7 cm and (AC - BC) = 1 cm. Find the values of sin A, cos A, sin C and cos C. **[3]**

31. The percentage of marks obtained by 100 students in an examination are given below: **[3]**

Percentage of Marks	Number of Students
30 - 35	16
35 - 40	14
40 - 45	18
45 - 50	20
50 - 55	18
55 - 60	12
60 - 65	2

Determine the median percentage of marks.

Section D

32. Solve for x: $\left(\frac{2x}{x-5}\right)^2 + 5\left(\frac{2x}{x-5}\right) - 24 = 0, x \neq 5$ **[5]**

OR

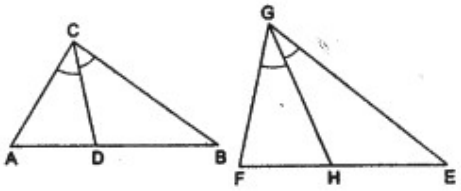
If x = - 2 is a root of the equation $3x^2 + 7x + p = 0$, find the value of k so that the roots of the equation $x^2 + k(4x + k - 1) + p = 0$ are equal.

33. In the given figure, CD and GH are respectively the bisectors of C and G respectively. If, $\Delta ABC \sim \Delta FEG$, prove that: **[5]**

a. $\triangle ADC \sim \triangle FHG$

b. $\triangle BCD \sim \triangle EGH$

c. $\frac{CD}{GH} = \frac{AC}{FG}$



34. A tent is of the shape of a right circular cylinder upto a height of 3 metres and then becomes a right circular cone with a maximum height of 13.5 metres above the ground. Calculate the cost of painting the inner side of the tent at the rate of Rs.2 per square metre, if the radius of the base is 14 metres. **[5]**

OR

A solid is composed of a cylinder with hemispherical ends. If the whole length of the solid is 104 cm and the radius of each of the hemispherical ends is 7 cm, find the cost of polishing its surface at the rate of ₹10 per dm^2.

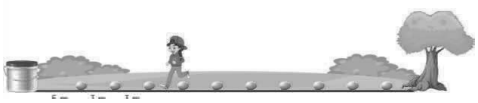
35. The following data gives the distribution of total monthly household expenditure of 200 families of a village. Find the modal monthly expenditure of the families. Also, find the mean monthly expenditure: **[5]**

Expenditure (in ₹)	Frequency
1000-1500	24
1500-2000	40
2000-2500	33
2500-3000	28
3000-3500	30
3500-4000	22
4000-4500	16
4500-5000	7

Section E

36. **Read the text carefully and answer the questions:** **[4]**

In a potato race, a bucket is placed at the starting point, which is 5 m from the first potato, and the other potatoes are placed 3 m apart in a straight line. There are ten potatoes in the line. A competitor starts from the bucket, picks up the nearest potato, runs back with it, drops it in the bucket, runs back to pick up the next potato, runs to the bucket to drop it in, and she continues in the same way until all the potatoes are in the bucket. What is the total distance the competitor has to run?



(i) Find the terms of AP formed in above situation.

(ii) What is the total distance the competitor has to run?

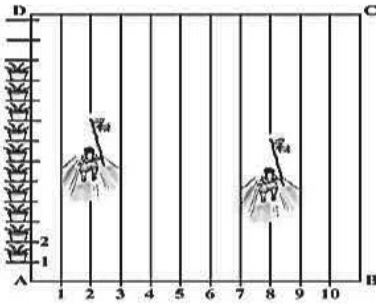
OR

Find the distance covered by competitor in order to put 5^{th} potato in the bucket.

(iii) Find distance cover after 4 potato drop in the bucket?

37. **Read the text carefully and answer the questions:** **[4]**

To conduct Sports Day activities, in your rectangular shaped school ground ABCD, lines have been drawn with chalk powder at a distance of 1 m each. 100 flower pots have been placed at a distance of 1 m from each other along AD, as shown in Fig. Sarika runs the distance AD on the 2nd line and posts a green flag. Priya runs the distance AD on the eighth line and posts a red flag. (take the position of feet for calculation)



(i) What co-ordinates you will use for Green Flag?

(ii) What is the distance between the green flag and the red flag?

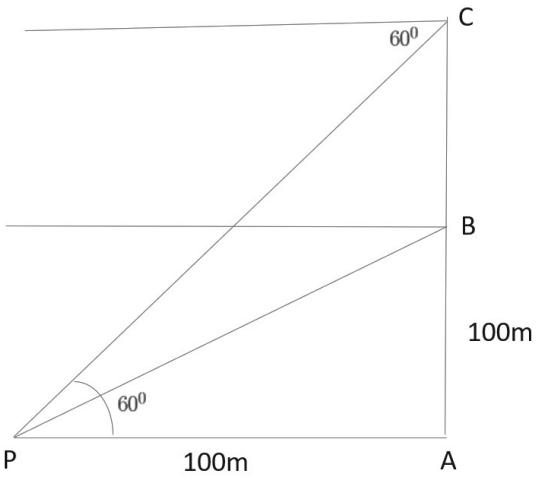
OR

What is the distance between green and blue flag?

(iii) If Monika wants to post a blue flag adjacently in between these two flags. Where she will post a blue flag?

38. **Read the text carefully and answer the questions:** **[4]**

A hot air balloon is rising vertically from a point A on the ground which is at distance of 100m from a car parked at a point P on the ground. Amar, who is riding the balloon, observes that it took him 15 seconds to reach a point B which he estimated to be equal to the horizontal distance of his starting point from the car parked at P.



(i) Find the angle of depression from the balloon at a point B to the car at point P.

(ii) Find the speed of the balloon?

OR

Find the total time taken by the balloon to reach the point C from ground?

(iii) After certain time Amar observes that the angle of depression is 60^o. Find the vertical distance travelled by the balloon during this time.