CBSE PRACTICE PAPER (2)

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.

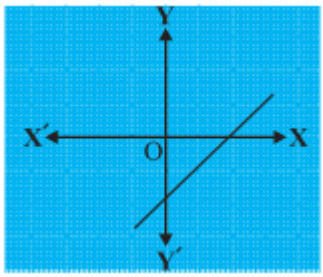
Section A

1. The LCM of smallest 2-digit number and smallest composite number is **[1]**

   a) 4 b) 20

   c) 40 d) 12

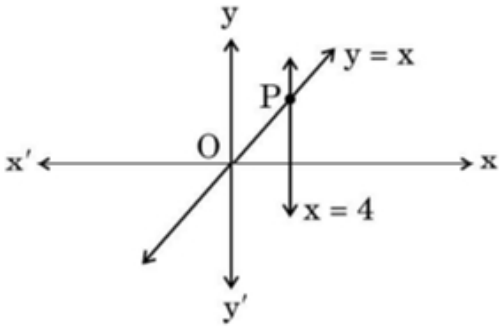
2. Find the number of zeroes of p(x) in the figure given below. **[1]**



   a) 0 b) 1

   c) 3 d) 2

3. The lines represented by the linear equations y = x and x = 4 intersect at P. The coordinates of the point P are: **[1]**



a) (4, 4)

b) (-4, 4)

c) (0, 4)

d) (4, 0)

4. A quadratic equation whose one root is 2 and the sum of whose roots is zero, is **[1]**

a) $4x^2 - 1 = 0$

b) $x^2 - 2 = 0$

c) $x^2 + 4 = 0$

d) $x^2 - 4 = 0$

5. The sum of the first 100 even natural numbers is: **[1]**

a) 10010

b) 10100

c) 2550

d) 5050

6. The distance of the point P(-6, 8) from origin is: **[1]**

a) -6

b) 8

c) 6

d) 10

7. If the mid-point of the line segment joining A(2a, 4) and B(-2, 3b) is M(1, 2a + 1), then the values of a and b respectively are **[1]**

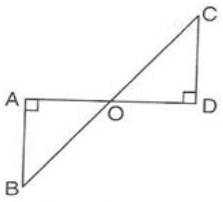
a) 3, 2

b) 5, 2

c) 2, 2

d) 2, 3

8. In the given figure$\Delta ABO \sim \Delta DCO$. If CD = 2cm, AB = 3 cm, OC = 3.2 cm, OD = 2.4 cm, then **[1]**



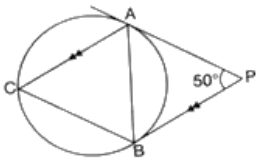
a) OA = 3 cm, OB = 4 cm.

b) OA = 4.3 cm, OB = 3.5 cm.

c) OA = 3.6 cm, OB = 4.8 cm.

d) OA = 3.2 cm, OB = 4.6 cm

9. In the given figure, PA and PB are tangents to a circle from an external point P. If $\angle APB = 50^\circ$ and $\mathrm{AC} \parallel \mathrm{PB}$, then the measures of angles of triangle ABC are **[1]**



a) 65°, 50°, 65°

b) 50°, 55°, 75°

c) 80°, 60°, 40

d) 50°, 50°, 80°

10. The length of the tangent from an external point P to a circle of radius 5 cm is 10 cm. The distance of the point from the centre of the circle is **[1]**

a) 12 cm

b) $\sqrt{125}$

c) $\sqrt{104}$cm

d) 8 cm

11. If cot A + $\frac{1}{\cot A}$ = 2 then $\cot^2 A + \frac{1}{\cot^2 A}$ = **[1]**

a) 1

b) -1

c) 2 d) 0

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

a) cos A b) sec A

c) sin A d) cosec A

13. The angle subtended by a tower of height 200 metres at a point 200 metres from the base is **[1]**

a) 45^o b) 0^o

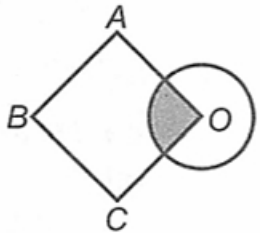
c) 30^o d) 60^o

14. In a circle of radius 21 cm, an arc subtends an angle of 60^o at the centre. The area of the sector formed by the arc is: **[1]**

a) 231 cm^2 b) 250 cm^2

c) 220 cm^2 d) 200 cm^2

15. O is the centre of a circle of diameter 4 cm and OABC is a square, if the shaded area is $\frac{1}{3}$ area of the square, then the side of the square is _____. **[1]**



a) $\sqrt{3\pi}$ cm b) $\pi\sqrt{3}$ cm

c) 3π cm d) $3\sqrt{\pi}$ cm

16. An unbiased die is thrown. The probability of getting an odd prime number is **[1]**

a) $\frac{2}{3}$ b) $\frac{1}{6}$

c) $\frac{1}{2}$ d) $\frac{1}{3}$

17. A bag contains 5 red balls and some blue balls. If the probability of drawing a blue ball is double that of a red ball, then the number of blue balls is **[1]**

a) 8 b) 10

c) 5 d) 12

18. The mean and median of distribution are 14 and 15 respectively. The value of mode is: **[1]**

a) 13 b) 16

c) 18 d) 17

19. **Assertion (A):** Two identical solid cubes of side 5 cm are joined end to end. The total surface area of the resulting cuboid is 350 cm^2. **[1]**

Reason (R): Total surface area of a cuboid is 2(lb + bh + hl)

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):** If S_n is the sum of the first n terms of an A.P., then its n^{th} term a_n is given by $a_n = S_n - S_{n-1}$ **[1]**

Reason (R): The 10^{th} term of the A.P. 5, 8, 11, 14, ... is 35.

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.

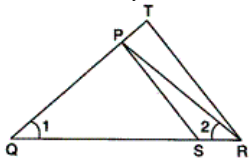
c) A is true but R is false.

d) A is false but R is true.

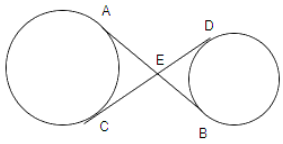
Section B

21. Show that $5 - 2\sqrt{3}$ is an irrational number. **[2]**

22. In Figure, $\frac{QR}{QS} = \frac{QT}{PR}$ and $\angle 1 = \angle 2$. Show that $\triangle PQS \sim \triangle TQR$. **[2]**



23. In the given figure, common tangents AB and CD to two circles intersect at E. Prove that AB = CD. **[2]**



24. Prove the identity: $\frac{\sin^2\theta}{1-\cos\theta} = \frac{1+\sec\theta}{\sec\theta}$ **[2]**

OR

If $\sin\theta + \cos\theta = \sqrt{3}$, then find the value of $\sin\theta \cdot \cos\theta$.

25. A horse is placed for grazing inside a rectangular field 70 m by 52 m and is tethered to one corner by a rope 21 m long. On how much area can it graze? **[2]**

OR

To warm ships for underwater rocks, a lighthouse spreads a red coloured light over a sector of angle 80° to a distance of 16.5 km. Find the area of the sea over which the ships are warned. (use $\pi = 3.14$)

Section C

26. A wine seller had three types of wine. 403 liters of 1st kind, 434 liters of 2nd kind and 465 liters of 3rd kind. Find the least possible number of casks of equal size in which different types of wine can be filled without mixing. **[3]**

27. If α and β are the zeros of the quadratic polynomial $f(x) = x^2 - 2x + 3$, find a polynomial whose roots are $\alpha + 2, \beta + 2$ **[3]**

28. Solve for x and y: **[3]**

$\frac{x+1}{2} + \frac{y-1}{3} = 9; \frac{x-1}{3} + \frac{y+1}{2} = 8$

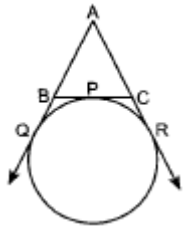
OR

Find two numbers such that the sum of twice the first and thrice the second is 92, and four times the first exceeds seven times the second by 2.

29. O is the centre of a circle of radius 5 cm. T is a point such that OT =13 cm and OT intersects the circle at E. If AB is the tangent to the circle at E. Find length of AB. **[3]**

OR

In figure, a circle touches the side BC of $\triangle$ABC at P and touches AB and AC produced at Q and R respectively. If AQ = 5 cm, find the perimeter of $\triangle$ABC.



30. Prove that: $2\left(\sin^6\theta+\cos^6\theta\right)-3\left(\sin^4\theta+\cos^4\theta\right)+1=0$ **[3]**

31. Following is the daily expenditure on lunch by 30 employees of a company: **[3]**

Daily Expenditure (in Rupees)	Number of Employees
100 - 120	8
120 - 140	3
140 - 160	8
160 - 180	6
180 - 200	5

Find the mean daily expenditure of the employees.

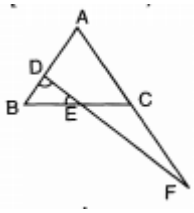
Section D

32. A train takes 2 hours less for a journey of 300 km if its speed is increased by 5 km/hr from its usual speed. Find the usual speed of the train. **[5]**

OR

Solve: $\frac{1}{x-2}+\frac{2}{x-1}=\frac{6}{x};x\neq 0,1,2$

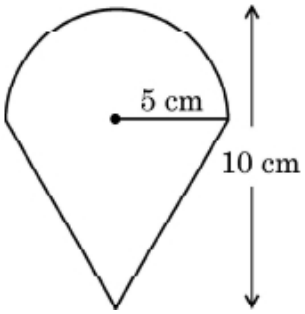
33. In the figure, $\angle BED=\angle BDE$ and In the figure, E is the midpoint of BC. Prove that $\frac{AF}{CF}=\frac{AD}{BE}$ **[5]**



34. A solid toy is in the form of a hemisphere surmounted by a right circular cone of same radius. The height of the cone is 10 cm and the radius of the base is 7 cm. Determine the volume of the toy. Also find the area of the coloured sheet required to cover the toy. (Use $\pi=\frac{22}{7}$ and $\sqrt{149}$ = 12.2) **[5]**

OR

An ice-cream filled cone having radius 5 cm and height 10 cm is as shown in the figure. Find the volume of the ice-cream in 7 such cones.



35. The following table shows the ages of the patients admitted in a hospital during a year: **[5]**

Age (in years)	5-15	15-25	25-35	35-45	45-55	55-65

Number of patients	6	11	21	23	14	5

Find the mode and the mean of the data given above. Compare and interpret the two measures of central tendency.

Section E

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

Suman is celebrating his birthday. He invited his friends. He bought a packet of toffees/candies which contains 360 candies. He arranges the candies such that in the first row there are 3 candies, in second there are 5 candies, in third there are 7 candies and so on.

(a) Find the total number of rows of candies.

(b) How many candies are placed in last row?

OR

Find the number of candies in 12th row.

(c) If Aditya decides to make 15 rows, then how many total candies will be placed by him with the same arrangement?

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

To raise social awareness about the hazards of smoking, a school decided to start a 'No smoking' campaign. 10 students are asked to prepare campaign banners in the shape of a triangle. The vertices of one of the triangles are P(-3, 4), Q(3, 4) and R(-2, -1).

(a) What are the coordinates of the centroid of △PQR?

(b) If T be the mid-point of the line joining R and Q, then what are the coordinates of T?

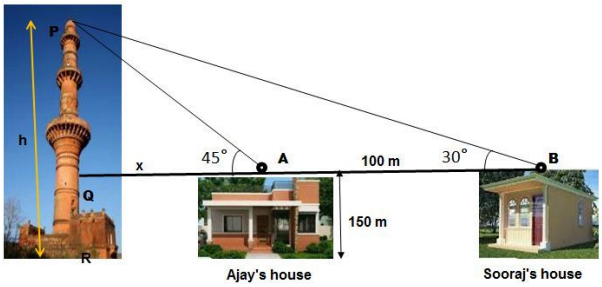
OR

What are the coordinates of centroid of △STU?

(c) If U be the mid-point of line joining R and P, then what are the coordinates of U?

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

The houses of Ajay and Sooraj are at 100 m distance and the height of their houses is the same as approx 150 m. One big tower was situated near their house. Once both friends decided to measure the height of the tower. They measure the angle of elevation of the top of the tower from the roof of their houses. The angle of elevation of ajay's house to the tower and sooraj's house to the tower are 45^o and 30^o respectively as shown in the figure.



(a) Find the height of the tower.

(b) What is the distance between the tower and the house of Sooraj?

OR

Find the distance between top of tower and top of Ajay's house?

(c) Find the distance between top of the tower and top of Sooraj's house?