



S R SAMPLE PAPER 4

Class 10 - Mathematics

Time Allowed: 3 hours

Maximum Marks: 80

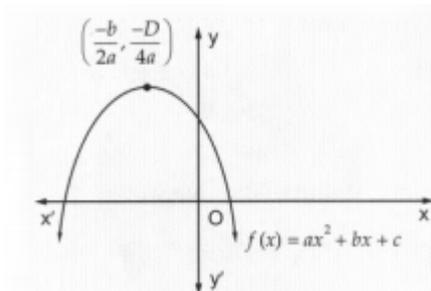
General Instructions:

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 number  $(5 - 3\sqrt{5} + \sqrt{5})$  is: [1]
  - a) an integer
  - b) an irrational number
  - c) a whole number
  - d) a rational number

2. If the diagram in Fig. shows the graph of the polynomial  $f(x) = ax^2 + bx + c$ , then [1]



- a)  $a < 0, b < 0$  and  $c < 0$
  - b)  $a < 0, b > 0$  and  $c > 0$
  - c)  $a < 0, b < 0$  and  $c > 0$
  - d)  $a < 0, b > 0$  and  $c < 0$
3. The lines represented by the linear equations  $y = x$  and  $x = 4$  intersect at P. The coordinates of the point P are: [1]



- c) 9 cm d) 10 cm
10. If PA and PB are tangents to the circle with centre O such that  $\angle APB = 50^\circ$ , then  $\angle OAB$  is equal to [1]
- a)  $50^\circ$  b)  $40^\circ$
- c)  $25^\circ$  d)  $30^\circ$
11. If  $\sec \theta - \tan \theta = \frac{1}{3}$ , then the value of  $(\sec \theta + \tan \theta)$  is: [1]
- a)  $\frac{2}{3}$  b) 3
- c)  $\frac{1}{3}$  d)  $\frac{4}{3}$
12.  $\frac{\cos^2 \theta}{\sin^2 \theta} - \frac{1}{\sin^2 \theta}$ , in simplified form, is: [1]
- a)  $\tan^2 \theta$  b)  $\sec^2 \theta$
- c) 1 d) -1
13. The angle of elevation of an aeroplane from a point on the ground is  $45^\circ$ . After a flight of 10 sec, the elevation changes to  $30^\circ$ . If the aeroplane is flying at a height of 3 km, then find the speed of the aeroplane. (Use  $\sqrt{3} = 1.732$ ) [1]
- a) 782.65 km/hr b) 785.46 km/hr
- c) 790.56 km/hr d) 780.56 km/hr
14. A pendulum swings through an angle of  $30^\circ$  and describes an arc 8.8 cm in length. Find the length of the pendulum. [1]
- a) 8.8 cm b) 17 cm
- c) 15.8 cm d) 16.8 cm
15. What is the formula to calculate the area of a sector? [1]
- a)  $\frac{x^\circ}{360^\circ} - \pi r^2$  b)  $\frac{x^\circ}{360^\circ} \times \pi r^3$
- c)  $\frac{x^\circ}{360^\circ} + \pi r^2$  d)  $\frac{x^\circ}{360^\circ} \times \pi r^2$
16. The probability of an impossible event is [1]
- a)  $\frac{1}{2}$  b) not defined
- c) 0 d) 1
17. A bag contains 50 balls of which 2x are red, 3x are white and 5x are blue. A ball is selected at random. The probability that it is not white is [1]
- a)  $\frac{7}{10}$  b)  $\frac{2}{5}$
- c)  $\frac{7}{45}$  d)  $\frac{3}{5}$
18. In the following distribution : [1]

Monthly income	Number of families
More than 10000	100
More than 13000	85
More than 16000	69



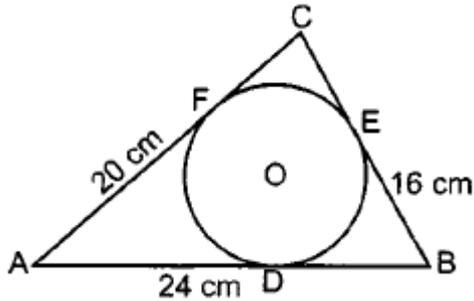
**Section C**

26. Shekar wants to plant 45 corn plants, 81 tomato plants, and 63 ginger plants. If he plants them in such a way that each row has the same number of plants and each row has only one type of plant, what is the greatest number of plants he can plant in a row? [3]
27. Find a quadratic polynomial whose sum and product of the zeroes are  $-2\sqrt{3}$ ,  $-9$  respectively. Also find the zeroes of the polynomial by factorisation. [3]
28. A fraction is such that if the numerator is multiplied by 3 and the denominator is reduced by 3, we get  $18/11$ , but if the numerator is increased by 8 and the denominator is doubled, we get  $2/5$ . Find the fraction. [3]

OR

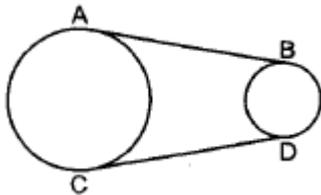
Solve for x and y using elimination method:  $10x + 3y = 75$ ,  $6x - 5y = 11$ .

29. A circle is inscribed in a  $\triangle ABC$  having sides 16 cm, 20 cm and 24 cm as shown in figure. Find AD, BE and CF. [3]



OR

In figure, AB and CD are common tangents to two circles of unequal radii. Prove that  $AB = CD$



30. If  $\tan \theta + \sin \theta = m$  and  $\tan \theta - \sin \theta = n$ , show that  $m^2 - n^2 = 4\sqrt{mn}$ . [3]
31. The number of students absent in a class were recorded every day for 120 days and the information is given in the following frequency table: [3]

<b>No. of students absent (x)</b>	0	1	2	3	4	5	6	7
<b>No. of days (f)</b>	1	4	10	50	34	15	4	2

**Section D**

32. A 2-digit number is such that the product of its digits is 24. If 18 is subtracted from the number, the digits interchange their places. Find the number. [5]

OR

A train travelling at a uniform speed for 360 km, would have taken 48 minutes less to travel the same distance if its speed were 5 km/hour more. Find the original speed of the train.

33. In a  $\triangle ABC$ , XY is parallel to BC and it divides  $\triangle ABC$  into two parts of equal area. Prove that  $\frac{BX}{AB} = \frac{\sqrt{2}-1}{\sqrt{2}}$ . [5]
34. A solid is in the form of a right circular cone mounted on a hemisphere. The radius of the hemisphere is 3.5 cm and the height of the cone is 4 cm. The solid is placed in a cylindrical tub, full of water, in such a way that the whole solid is submerged in water. If the radius of the cylinder is 5 cm and its height is 10.5 cm, find the volume of water left in the cylindrical tub. (Use  $\pi = \frac{22}{7}$ ) [5]

OR

A toy is in the form of a cone mounted on a hemisphere of radius 3.5 cm. The total height of the toy is 15.5 cm; find

the total surface area and volume of the toy.

35. The following are the ages of 200 patients getting medical treatment in a hospital on a particular day : [5]

Age (in years)	10-20	20-30	30-40	40-50	50-60	60-70
Number of Patients	40	22	35	50	23	30

Write the above distribution as 'less than type' cumulative frequency distribution and also draw an ogive to find the median.

### Section E

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

Elpis Technology is a TV manufacturer company. It produces smart TV sets not only for the Indian market but also exports them to many foreign countries. Their TV sets have been in demand every time but due to the Covid-19 pandemic, they are not getting sufficient spare parts, especially chips to accelerate the production. They have to work in a limited capacity due to the lack of raw materials.



- (a) They produced 600 sets in the third year and 700 sets in the seventh year. Assuming that the production increases uniformly by a fixed number every year, find an increase in the production of TV every year.
- (b) They produced 600 sets in the third year and 700 sets in the seventh year. Assuming that the production increases uniformly by a fixed number every year, find in which year production of TV is 1000.

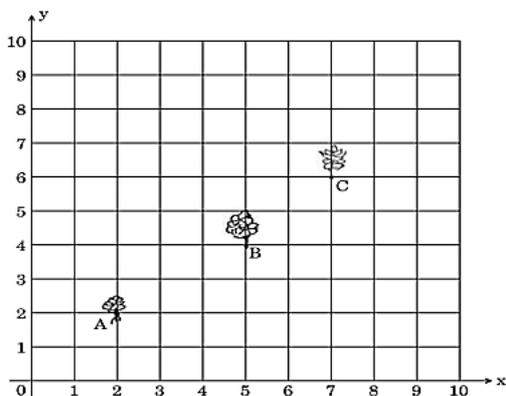
OR

They produced 600 sets in the third year and 700 sets in the seventh year. Assuming that the production increases uniformly by a fixed number every year, find the total production in first 7 years.

- (c) They produced 600 sets in the third year and 700 sets in the seventh year. Assuming that the production increases uniformly by a fixed number every year, find the production in the 10th year.

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

Reena has a  $10\text{ m} \times 10\text{ m}$  kitchen garden attached to her kitchen. She divides it into a  $10 \times 10$  grid and wants to grow some vegetables and herbs used in the kitchen. She puts some soil and manure in that and sow a green chilly plant at A, a coriander plant at B and a tomato plant at C. Her friend Kavita visited the garden and praised the plants grown there. She pointed out that they seem to be in a straight line. See the below diagram carefully:



- (a) Find the distance between A and B?
- (b) Find the mid-point of the distance AB?

OR

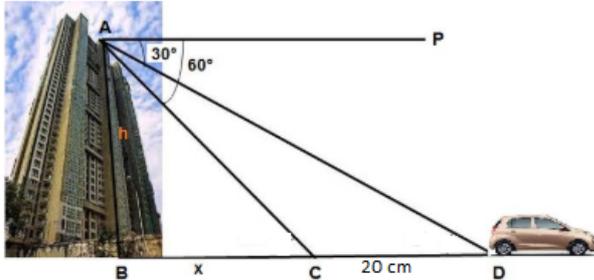
Find the mid point of BC.

(c) Find the distance between B and C?

38. **Read the text carefully and answer the questions:**

[4]

Vijay lives in a flat in a multi-story building. Initially, his driving was rough so his father keeps eye on his driving. Once he drives from his house to Faridabad. His father was standing on the top of the building at point A as shown in the figure. At point C, the angle of depression of a car from the building was  $60^\circ$ . After accelerating 20 m from point C, Vijay stops at point D to buy ice cream and the angle of depression changed to  $30^\circ$ .



- (a) Find the value of x.  
(b) Find the height of the building AB.

**OR**

Find the distance between top of the building and a car at position C?

- (c) Find the distance between top of the building and a car at position D?

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