



# VIDHYALAKSHMI SENIOR SECONDARY SCHOOL

Chennangkuppam, Gudiyattam

## Class 10 - Mathematics

### Sample Paper 1

Maximum Marks: 80

Time Allowed: 3 hours

#### General Instructions:

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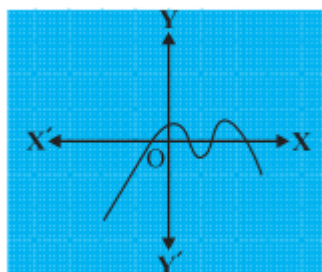
- All the questions are compulsory.
- The question paper consists of 40 questions divided into 4 sections A, B, C, and D.
- Section A comprises of 20 questions of 1 mark each. Section B comprises of 6 questions of 2 marks each. Section C comprises of 8 questions of 3 marks each. Section D comprises of 6 questions of 4 marks each.
- There is no overall choice. However, an internal choice has been provided in two questions of 1 mark each, two questions of 2 marks each, three questions of 3 marks each, and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
- Use of calculators is not permitted.

#### Section A

- The difference of two distinct irrational numbers is always 1
  - a rational number
  - an irrational number
  - none of these
  - a rational number or irrational number
- A rational number can be expressed as a non-terminating repeating decimal if the denominator has the factors 1
  - none of these
  - other than 2 or 5 only
  - 2 or 5 only
  - 2 or 3 only

- Fill in the blanks: 1

The graph of  $y = p(x)$  is given in figure below, for some polynomial  $p(x)$ . The number of zeroes of  $p(x)$  is \_\_\_\_\_.



- Write 32875 as product of prime factors. Is this factorisation unique? 1
- A fraction becomes  $\frac{9}{11}$ , if 2 is added to both the numerator and denominator. If 3 is added to both the numerator and denominator it becomes  $\frac{5}{6}$ , then the fraction is 1
  - $\frac{9}{7}$
  - $\frac{-9}{7}$
  - $\frac{7}{9}$
  - $\frac{-7}{9}$

6. In the following equation determine the set of values of  $p$  for which the given equation has real roots:  $2x^2 + px + 3 = 0$ . 1

7. Fill in the blanks: 1

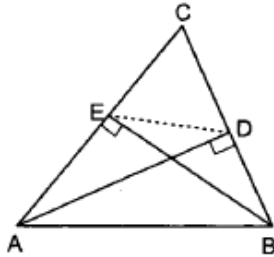
If in an A.P.  $a = 5$ ,  $d = 0$ , then the twenty-second term is \_\_\_\_\_.

8. Determine  $k$  so that  $4k + 8$ ,  $2k^2 + 3k + 6$  and  $3k^2 + 4k + 4$  are three consecutive terms of an AP. 1

9. Fill in the blanks: 1

All \_\_\_\_\_ triangles are similar.

10. In Fig. AD and BE are respectively perpendiculars to BC and AC. Show that  $\triangle ADC \sim \triangle BEC$  1



11. The abscissa of any point on the  $y$  - axis is 1

- a) 0 b) 1
- c)  $y$  d)  $-1$

12. If the co - ordinates of a point are  $(-5, 11)$ , then its abscissa is 1

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

13. If the point  $P(2, 1)$  lies on the line segment joining points  $A(4, 2)$  and  $B(8, 4)$ , then AP is equal to 1

- a)  $AP = \frac{1}{4} AB$  b)  $AP = \frac{1}{2} AB$
- c)  $AP = \frac{1}{3} AB$  d)  $AP = PB$

14.  $\cot^2 \theta - \frac{1}{\sin^2 \theta} =$  1

- a)  $\tan^2 \theta$  b)  $\cot^2 \theta$
- c)  $-1$  d) 1

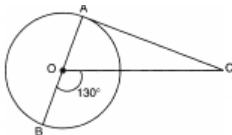
15. Choose the correct option. Justify your choice.  $9\sec^2 A - 9\tan^2 A$  1

- a) 8 b) 9
- c) 0 d) 1

16. If  $\tan \theta = \sqrt{3}$ , then  $\sec \theta =$  1

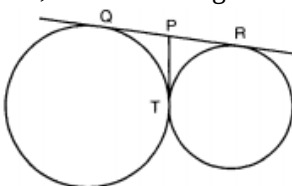
- a)  $\sqrt{\frac{3}{2}}$  b) 2
- c)  $\frac{2}{\sqrt{3}}$  d)  $\frac{1}{\sqrt{3}}$

17. In the given figure, AOB is a diameter of the circle with centre O and AC is a tangent to the circle at A. If  $\angle BOC = 130^\circ$ , then find  $\angle ACO$  1



OR

In the figure, QR is a common tangent to given circle which meet at T. Tangent at T meets QR at P. If  $QP = 3.8$  cm, then find length of QR.



18. Fill in the blanks: 1

A shoe box is a 15cm long, 10cm broad and 9cm high. The volume of the box is \_\_\_\_\_.

19. The measure of central tendency that can be obtained graphically is 1

- a) none of these  
c) mode

- b) median  
d) mean

20. Fill in the blanks:

An event having only one outcome of the random experiment is called an \_\_\_\_\_.

1

**Section B**

21. A vessel is in the form of a hollow hemisphere mounted by a hollow cylinder. The diameter of the hemisphere is 14 cm and the total height of the vessel is 13 cm. Find the inner surface area of the vessel. 2

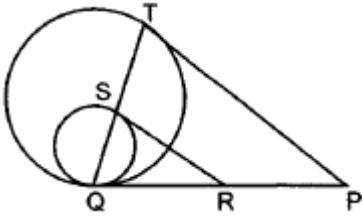
22. A card is drawn at random from a well-shuffled deck of 52 playing cards. Find the probability that the card drawn is 2

- i. a card of spades or an ace,
- ii. a black king,
- iii. neither a jack nor a king,
- iv. either a king or a queen.

OR

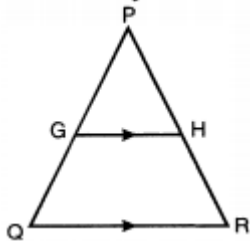
Two different dice are thrown together. Find the probability that the sum of the numbers appeared is less than 7.

23. In the following figure, PQ is the common tangent to both the circles. SR and PT are tangent to both the circles. If SR = 4 cm, PT = 7 cm, then find RP. 2



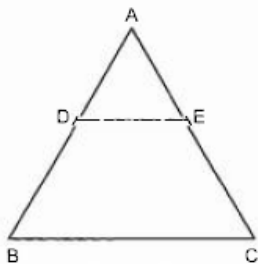
24. A circus artist is climbing a 20 m long rope, which is tightly stretched and tied from the top of a vertical pole to the ground. Find the height of the pole, if the angle made by the rope with the ground level is 30°. 2

25. In the given figure, G is the mid-point of the side PQ of  $\triangle PQR$  and  $GH \parallel QR$ . Prove that H is the mid-point of the side PR of the triangle PQR. 2



OR

In Fig.  $DE \parallel BC$ . If DE = 4cm, BC = 8 cm and Area ( $\triangle ADE$ ) = 25 cm<sup>2</sup>, find the area of  $\triangle ABC$ .



26. The sum of the first three terms of an A.P. is 33. If the product of first and the third term exceeds the second term by 29, find the AP. 2

**Section C**

27. For a morning walk, three persons steps off together. The measure of their steps is 80,85 and 90 cm respectively. What is the minimum distance each should walk so that all can cover the same distance in complete steps? 3

OR

Prove that  $\sqrt{6}$  is irrational.

28. If the zeros of the polynomial  $x^3 - 3x^2 + x + 1$  are (a - b), a and (a + b), find the values of a and b. 3

29. Solve the following system of linear equations: 3

$$a(x + y) + b(x - y) = a^2 - ab + b^2$$

$$a(x + y) - b(x - y) = a^2 + ab + b^2$$

OR

Find the value of k for which the system

$$3x + y = 1$$

$$kx + 2y = 5$$

has (i) a unique solution, and (ii) no solution.

30. Find the sum of first 24 terms of the list of no. whose  $n^{\text{th}}$  term is given by  $a_n = 3 + 2n$ . 3

31. Find points on the x-axis, each of which is at a distance of 10 units from the point A (11, -8). 3

32. Prove that :  $\frac{\sin \theta - 2 \sin^3 \theta}{2 \cos^3 \theta - \cos \theta} = \tan \theta$  3

OR

A rhombus of side 20 cm has two angles of  $60^\circ$  each. Find the length of the diagonals.

33. The radius of a circle with centre O is 7 cm. Two radii OA and OB are drawn at right angles to each other. Find the areas of minor and major segments. 3

34. The following table gives the number of children of 150 families in a village 3

<b>No. of children (x)</b>	0	1	2	3	4	5
<b>No. of families (f)</b>	10	21	55	42	15	7

Find the average number of children per family.

**Section D**

35. Solve for x: 4

$$\frac{1}{(x-1)(x-2)} + \frac{1}{(x-2)(x-3)} = \frac{2}{3}; x \neq 1, 2, 3$$

OR

The diagonal of a rectangular field is 60 metres more than the shorter side. If, the longer side is 30 metres more than the shorter side, find the sides of the field.

36. In an acute-angled triangle, express the median in terms of its sides. 4

37. From a point on a bridge across a river, the angles of depression of the banks on opposite sides of the river are  $30^\circ$  and  $45^\circ$  respectively. If the bridge is at a height of 2.5m from the banks, find the width of the river. [Take  $\sqrt{3} = 1.732$ .] 4

38. Draw two concentric circles of radii 4 cm and 6 cm. Construct a tangent to the smaller circle from a point on the larger circle. Measure the length of this tangent. 4

OR

Draw a circle of radius 4 cm. Take a point P on it. Without using the centre of the circle, draw a tangent to the circle at point P.

39. An iron pillar has some part in the form of a right circular cylinder and remaining in the form of a right circular cone. The radius of base of each of cone and cylinder is 8 cm. The cylindrical part is 240 cm high and the conical part is 36 cm high. Find the weight of the pillar, if one cubic cm of iron weighs 10 g. 4

OR

If the radii of the circular ends of a conical bucket, which is 16 cm high, are 20 cm and 8 cm, find the capacity and total surface area of the bucket.

40. During the medical check-up of 35 students of a class their weights were recorded as follows: 4

Weight(in kg)	38- 40	40 - 42	42 - 44	44 - 46	46 - 48	48 - 50	50 - 52
Number of students	3	2	4	5	14	4	3

Draw a less than type and a more than type ogive from the given data. Hence, obtain the median weight from the graph.