



# VIDHYALAKSHMI SENIOR SECONDARY SCHOOL

Chennangkuppam, Gudiyattam

## Class 10 - Mathematics

### Sample Paper 2

Maximum Marks: 80

Time Allowed: 3 hours

#### General Instructions:

- 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

- If  $9^{x+2} = 240 + 9^x$ , then the value of 'x' is 1
  - 0.5
  - 0.1
  - 0.3
  - 0.2
- If 'a' and 'b' are both positive rational numbers, then  $(\sqrt{a} + \sqrt{b})(\sqrt{a} - \sqrt{b})$  will be 1
  - neither rational nor rational number
  - a rational number
  - an irrational number
  - none of these
- If  $\sum f_i u_i = 29$ ,  $\sum f_i = 30$ ,  $a = 47.5$  and  $h = 15$ , then the value of  $\bar{x}$  is 1
  - 63
  - 26
  - 64
  - 62
- The product of two successive integral multiples of 5 is 1050. Then the numbers are 1
  - 25 and 42
  - 25 and 30
  - 30 and 35
  - 35 and 40
- Given that  $\sin \alpha = \frac{1}{\sqrt{2}}$  and  $\cos \beta = \frac{1}{\sqrt{2}}$ , then the value of  $(\alpha + \beta)$  is 1
  - $90^\circ$
  - $45^\circ$
  - $60^\circ$
  - $30^\circ$
- Choose the correct option and justify your choice:  $\frac{2 \tan 30^\circ}{1 - \tan^2 30^\circ}$  1
  - $\cos 60^\circ$
  - $\sin 30^\circ$
  - $\sin 60^\circ$
  - $\tan 60^\circ$
- A pole 6 m high casts a shadow  $2\sqrt{3}$ m long on the ground, then the sun's elevation is 1
  - $30^\circ$
  - $60^\circ$
  - $45^\circ$
  - $75^\circ$
- If the co-ordinates of a point are  $(-5, 11)$ , then its abscissa is 1

a) - 5

b) 11

c) 5

d) - 11

9. The distance of a point from the y – axis is called

1

a) origin

b) None of these

c) abscissa

d) ordinate

10. The probability that it will rain on a particular day is 0.76. The probability that it will not rain on that day is

1

a) 0.24

b) 0.76

c) 0

d) 1

11. Fill in the blanks:

1

Lateral surface area of cuboid = \_\_\_\_\_.

12. Fill in the blanks:

1

The product of the zeroes of  $-2x^2 + kx + 6$  is \_\_\_\_\_.

OR

Fill in the blanks:

If  $S(x) = px^2 + (p - 2)x + 2$  and '2' is the zero of this polynomial, then the value of p is \_\_\_\_\_.

13. Fill in the blanks:

1

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

14. Fill in the blanks:

1

The common difference of the AP:  $\sqrt{3}, 2\sqrt{3}, 3\sqrt{3}$ , is \_\_\_\_\_.

15. Fill in the blanks:

1

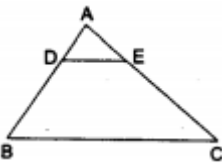
The distance between the points A(-5, 7), B(-1, 3) is \_\_\_\_\_.

16. Show that 23.123456789 is rational. What can you say about the prime factors of their denominators?

1

17. If D and E are points on the sides AB and AC respectively of  $\triangle ABC$  such that  $AB = 5.6$  cm,  $AD = 1.4$  cm,  $AC = 7.2$  cm and  $AE = 1.8$  cm, show that  $DE \parallel BC$ .

1



18. The first term of an AP is p and its common difference is q. Find its 10th term.

1

OR

Find the sum of each of the following APs: -37, -33, -29,... to 12 terms.

19. From an external point C, k tangents can be drawn to the circle. Find the value of k.

1

20. Show that  $x = -3$  is a solution of  $x^2 + 6x + 9 = 0$ .

1

### Section B

21. A game consists of tossing a coin 3 times and noting the outcome each time. If getting the same result in all the tosses is a success, find the probability of losing the game.

2

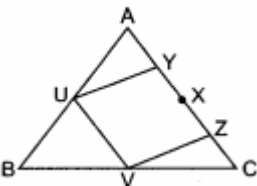
22. Find the value of k for which the roots are real and equal of equation:

2

$$kx^2 - 2\sqrt{5}x + 4 = 0$$

23. In  $\triangle ABC$ , X is any point on AC. If Y, Z, U and V are the middle points on AX, XC, AB and BC respectively, then prove that  $UY \parallel VZ$  and  $UV \parallel YZ$ .

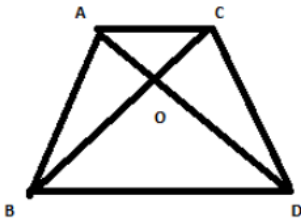
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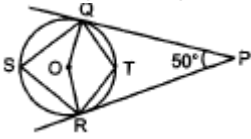
OR

In the figure, ABC and DBC are two triangles on the same base BC. If AD intersect EC at O, prove that

$$\frac{ar(\text{triangle } ABC)}{ar(\text{triangle } DBC)} = \frac{AO}{DO}$$



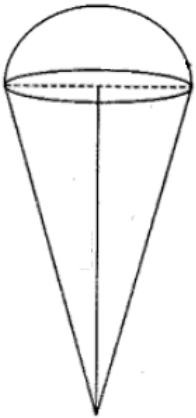
24. Find the angle of elevation of the top of 15 m high tower at a point 15 m away from the base of the tower. 2  
 25. In the given figure, find  $\angle QSR$ . 2



OR

A circle is touching the side BC of  $\triangle ABC$  at P and touching AB and AC produced at Q and R respectively. Prove that  $AQ = \frac{1}{2}(\text{perimeter of } \triangle ABC)$ .

26. An 'ice-cream seller used to sell different kinds and different shapes of ice-cream like rectangular shaped 2  
 with one end hemispherical, cone-shaped and rectangular brick, etc. One day a child came to his shop and  
 purchased an ice-cream which has the following shape: ice-cream cone as the union of a right circular  
 cone and a hemisphere that has the same (circular) base as the cone. The height of the cone is 9 cm and the  
 radius of its base is 2.5 cm.



By reading the above-given information, find the following:

- The volume of the ice-cream without hemispherical end.
- The volume of the ice-cream with a hemispherical end.

### Section C

27. Prove that  $7\sqrt{5}$  is irrational. 3

OR

Prove that  $(3 + 2\sqrt{5})^2$  is irrational.

28. An AP consists of 21 terms. The sum of the three terms in the middle is 129 and of the last three is 237. Find 3  
 the AP.  
 29. Solve for x and y:  $4x + 6y = 3xy$ ;  $8x + 9y = 5xy(x \neq 0, y \neq 0)$ . 3

OR

Solve the following systems of equations by using the method of substitution:

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

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

30. Divide the polynomial  $f(x) = 6x^3 + 11x^2 - 39x - 65$  by the polynomial  $g(x) = x^2 - 1 + x$ . Also, find the quotient 3  
 and remainder.  
 31. Find the value of m for which the points with coordinates (3, 5), (m, 6) and  $(\frac{1}{2}, \frac{15}{2})$  are collinear. 3  
 32. If,  $\sin \theta = \frac{a^2 - b^2}{a^2 + b^2}$  find the values of the other five trigonometric ratios. 3

OR

In a right triangle ABC right angled at B if  $\sin A = \frac{3}{5}$  find all the six trigonometric ratios of  $\angle C$ .

33. The cost of fencing a circular field at the rate Rs 24 per metre is Rs 5280. The field is to be ploughed at the 3

rate of Rs 0.50 per  $m^2$ . Find the cost of ploughing the field.

34. Find the arithmetic mean of the following frequency distribution

3

Class	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54	55 - 59
Frequency	14	22	16	6	5	3	4

**Section D**

35. Draw a line segment of length 5 cm and divide it in the ratio 3 : 7.

4

OR

Draw a circle of radius 4 cm. Construct a pair of tangents to it, the angle between which is  $60^\circ$ . Also, justify the construction. Measure the distance between the centre of the circle and the point of intersection of tangents.

36. PQRS is a trapezium with  $PQ \parallel SR$  Diagonals PR and SQ intersect at M and  $\Delta PMS \sim \Delta QMR$ . Prove that PS = QR.

4

37. If 2 is subtracted from the numerator and 1 is added to the denominator, a fraction becomes  $\frac{1}{2}$  but when 4 is added to the 2 numerator and 3 is subtracted from the 3 denominator, it becomes  $\frac{3}{2}$ . Find the fraction.

4

OR

Ved travels 600 km to his home partly by train and partly by car. He takes 8 hours if he travels 120 km by train and the rest by car. He takes 20 minutes longer if he travels 200 km by train and the rest by car. Find the speed of the train and the car.

38. A cistern, internally measuring  $150\text{cm} \times 120\text{cm} \times 110\text{cm}$  has  $129600\text{ cm}^3$  of water in it. Porous bricks are placed in the water until the cistern is full to the brim. Each brick absorbs one seventeenth of its own volume of water. How many bricks can be put in without the water overflowing, each brick being  $22.5\text{cm} \times 7.5\text{cm} \times 6.5\text{cm}$ ?

4

OR

A well of diameter 2 m is dug 14 m deep. The earth taken out of it is spread evenly all around it to form an embankment of height 40 cm. Find the width of the embankment.

39. On the same side of a tower, two objects are located. When observed from the top of the tower, their angles of depression are  $45^\circ$  and  $60^\circ$ . If the height of the tower is 150 m, find the distance between the objects.

4

40. Find the mean of each of the following frequency distributions:

4

Class Interval	0-6	6-12	12-18	18-24	24-30
Frequency	7	5	10	12	6