Goa Board
Class IX Mathematics
Term II
Sample Paper - 2

Time: 3½ hrs **Total Marks: 90**

General Instructions:

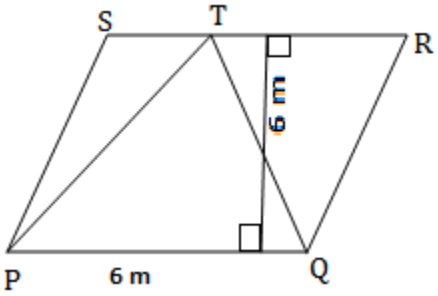
1. **All** questions are **compulsory**.
2. The question paper consists of **34** questions divided into **four sections** A, B, C, and D. **Section A** comprises of **8** questions of 1 mark each, **Section B** comprises of **6** questions of 2 marks each, **Section C** comprises of **10** questions of 3 marks each and **Section D** comprises of **10** questions of 4 marks each.
3. Question numbers **1 to 8** in **Section A** are multiple choice questions where you are to select **one** correct option out of the given four.
4. There is no overall choice. However, internal choice has been provided in **1** question of **two marks**, **3** questions of **three marks** each and **2** questions of **four marks** each. You have to attempt only one of the alternatives in all such questions.
5. Use of calculator is **not** permitted.

(SECTION – A)

1. Two solutions for the equation $2x + y = 1$ are

(A) (0, 1) and (1, 0)
(B) (0, 1) and (1/2, 0)
(C) (2, 0) and (1, 2)
(D) (2, 3) and (4, 5)

2. In the given figure, PQRS is a parallelogram, then area(ΔPTQ) is



(A) 12 m^2
(B) 18 m^2
(C) 6 m^2
(D) 24 m^2

3. A point with ordinate 3 and abscissa –4 will lie in the
(A) Ist Quadrant
(B) IInd Quadrant
(C) IIIrd Quadrant
(D) IVth Quadrant

4. A line l intersects two concentric circles at P, Q, R and S. Then
(A) PQ = RS
(B) PS.RS = PS.PQ
(C) TS = PR
(D) PQ > RS

5. A frequency distribution has class intervals 0 – 10, 10 – 20, 20 – 30, and so on. In such a distribution 20 would be considered to belong to which class?
(A) 10 – 200
(B) 11 – 20
(C) 20 – 30
(D) 21 – 30

6. The sum of the probabilities of the happening and not happening of an event is:
(A) 1
(B) 2
(C)
(D) 0
(E) None of the above

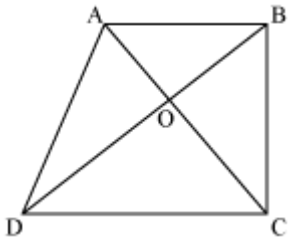
7. The relation between the surface area of a sphere and lateral surface area of a right circular cylinder that just encloses the sphere is
(A) Surface area of the sphere is equal to the lateral surface area of the right circular cylinder.
(B) Surface area of the sphere is less than the lateral surface of the right circular cylinder.
(C) Surface area of the sphere is greater than the lateral surface area of the right circular cylinder.
(D) Lateral surface area of the sphere is less than the surface of the right circular cylinder.

8. A conical tank is 6 m deep and its circular top has a radius 1.4 m. Find the capacity of the tank.
(A) 86.25 m^3
(B) 12.32 m^3
(C) 8.8 m^3
(D) 52.8 m^3

(SECTION – B)

9. A rectangular sheet of card paper, 44 cm × 20 cm in size, is rolled along its length and a cylinder is formed. Find the volume of the cylinder.

10. Diagonals AC and BD of a trapezium ABCD with AB || DC intersect each other at O. Prove that area(ΔAOD) = area(ΔBOC).



11. A study was conducted to find out the concentration of sulphur dioxide in the air in parts per million (ppm) of a certain city. The data obtained for 30 days is as follows:

0.03	0.08	0.08	0.09	0.04	0.17	0.16	0.05	0.02	0.06	0.18	0.20
0.11	0.08	0.12	0.13	0.22	0.07	0.08	0.01	0.10	0.06	0.09	0.18
0.11	0.07	0.05	0.07	0.01	0.04						

i. Make a grouped frequency distribution table for this data with class intervals as 0.00 - 0.04, 0.04 - 0.08, and so on.
ii. For how many days, was the concentration of sulphur dioxide more than 0.11 ppm?

12. Recall that two circles are congruent if they have the same radii. Prove that equal chords of congruent circles subtend equal angles at their centres.

13. Three coins were tossed 30 times simultaneously. Each time the number of heads occurring was noted down as follows:

0	1	2	2	1	2	3				
1	3	0	1	3	1	1	2	2	0	1
2	1	3	0	0	1	1	2	3	2	2
0										

Prepare a frequency distribution table for the data given above.

14. Find the mode of 14, 25, 14, 28, 18, 17, 18, 14, 23, 22, 14, and 18.

(SECTION – C)

15. In countries like the US of A and Canada, temperature is measured in Fahrenheit, whereas in countries like India it is measured in Celsius. Here is a linear equation that converts Fahrenheit to Celsius:

$$F = \left(\frac{9}{5}\right)C + 32$$

i. Draw the graph of the linear equation above using Celsius on the x-axis and Fahrenheit for the y-axis.

ii. If the temperature is 30°C, what is the temperature in Fahrenheit?

iii. If the temperature is 95°F, what is the temperature in Celsius?

16. Show that the diagonals of a rhombus are perpendicular to each other.

17. Construct ΔABC in which BC = 8 cm, m∠B = 45° and AB – AC = 3.5 cm.

18. A bus stop is barricaded from the remaining part of the road, by using 50 hollow cones made of recycled cardboard. Each cone has a base diameter of 40 cm and height 1 m. If the outer side of each of the cones is to be painted and the cost of painting them is Rs. 12/ m^2, what will be the cost of painting all these cones? (Use π = 3.14 and take $\sqrt{1.04}$ = 1.02).

OR

Parveen wanted to make a temporary shelter for her car, by making a box-like structure with tarpaulin that covers all the four sides and the top of the car (with the front face as a flap which can be rolled up). Assuming that the stitching margins are very small, and therefore negligible, how much tarpaulin would be required to make the shelter of height 2.5 m, with base dimensions 4 m × 3 m?

19. If the mean of the following frequency distribution is 8, find the value of p.

X	3	5	7	9	11	13
F	6	8	15	p	8	4

OR

The distance (in km) from the residence to place of work of 40 engineers was found to be as follows:

5	3	10	20	25	11	13	7	12	31
19	10	12	17	18	11	32	17	16	2
7	9	7	8	3	5	12	15	18	3
12	14	2	9	6	15	15	7	6	12

What is the empirical probability that an engineer lives:

i. less than 7 km from his/ her place of work?
ii. more than or equal to 7 km from his/ her place of work?
iii. within $\frac{1}{2}$ km from his/ her place of work?

20. Find two solutions for each of the following equations:

i. $4x + 3y = 12$
ii. $2x + 5y = 0$
iii. $3y + 4 = 0$

OR

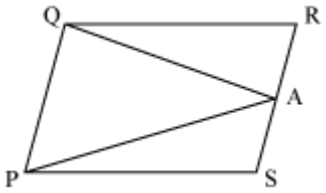
Yamini and Fatima, two students of Class IX of a school, together contributed Rs. 100 towards the Prime Minister's Relief Fund to help earthquake victims. Give a linear equation which satisfies this data. (You may take their contributions as Rs. x and Rs y.) Draw the graph of the same.

21. A metal pipe is 77 cm long. The inner diameter of a cross section is 4 cm, the outer diameter being 4.4 cm. Find its

i. Inner curved surface area,
ii. Outer curved surface area,
iii. Total surface area.

22. Show that if the diagonals of a quadrilateral bisect each other at right angles, then it is a rhombus.

23. A farmer with a field in the form of a parallelogram PQRS. He took any point A on RS and joined it to points P and Q. In how many parts the field is divided? What are the shapes of these parts? The farmer wants to sow wheat and pulses in equal portions of the field separately. How should he do it?



24. An organisation selected 2400 families at random and surveyed them to determine a relationship between the income level and the number of vehicles in a family. The information gathered is listed in the table below:

Monthly income (in Rs)	Vehicles per family			
	0	1	2	Above 2
Less than 7000	10	160	25	0
7000 – 10000	0	305	27	2
10000 – 13000	1	535	29	1
13000 – 16000	2	469	59	25
16000 or more	1	579	82	88

Number of families surveyed = 2400

Suppose a family is chosen, find the probability that the family chosen has

i. Earnings between Rs. 10000 – Rs. 13000 per month and owns exactly 2 vehicles.
ii. Earnings of Rs. 16000 or more per month and owns exactly 1 vehicle.
iii. Earnings less than Rs. 7000 per month and does not own any vehicle.

(SECTION – D)

25. Show that if the diagonals of a quadrilateral are equal and bisect each other at right angles, then it is a square.

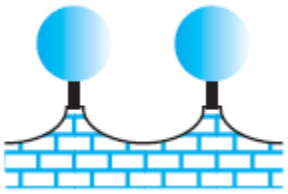
26. Construct an angle of 90° at the initial point of a given ray and justify the construction.

OR

Construct an equilateral triangle of side 5 cm and justify the construction.

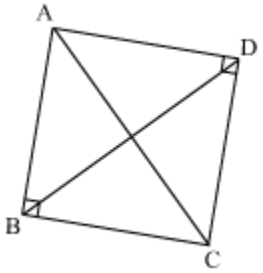
27. Write four solutions for $2x + y = 7$.

28. The front compound wall of a house is decorated by wooden spheres of diameter 21 cm, placed on small supports as shown in the given figure. Eight such spheres are used for this purpose, and are to be painted silver. Each support is a cylinder of radius 1.5 cm and height 7 cm and is to be painted black. Find the cost of paint required if silver paint costs 25 paise per cm^2 and black paint costs 5 paise per cm^2.



29. Two circles of radii 5 cm and 3 cm intersect at two points and the distance between their centres is 4 cm. Find the length of the common chord.

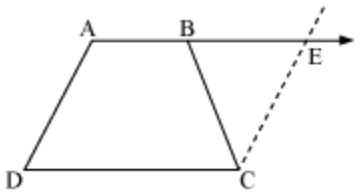
30. ΔABC and ΔADC are two right triangles with common hypotenuse AC. Prove that ∠CAD = ∠CBD.



OR

ABCD is a trapezium in which AB || CD and AD = BC (see the given figure). Show that

i. $\angle A = \angle B$
ii. $\angle C = \angle D$
iii. $\Delta ABC \cong \Delta BAD$
iv. Diagonal AC = Diagonal BD



31. If the work done by a body on application of a constant force is directly proportional to the distance travelled by the body, express this relationship in the form of an equation in two variables and draw the graph of the same by taking the constant force as 5 units. Also read from the graph the work done when the distance travelled by the body is

i. 2 units
ii. 0 units

32. The lengths of two parallel chords of a circle are 6 cm and 8 cm. If the smaller chord is at distance 4 cm from the centre, what is the distance of the other chord from the centre?

33. A cubical box has edges each of 10 cm and another cuboidal box is 12.5 cm long, 10 cm wide and 8 cm high.

i. Which box has the greater lateral surface area and by how much?
ii. Which box has the smaller total surface area and by how much?

34. Draw a frequency polygon for the following frequency distribution:

Class-interval	1-10	11-20	21-30	31-40	41-50	51-60
Frequency	8	3	6	12	2	7