SHREE RADHEY COACHING CENTER

CLASS 10 - MATHEMATICS
Maths Sample Paper 1

Time Allowed: 3 hours   **Maximum Marks: 80**

General Instructions:

1. This question paper contains two parts A and B.

2. Both Part A and Part B have internal choices.

Part – A consists 20 questions

1. Questions 1-16 carry 1 mark each. Internal choice is provided in 5 questions.

2. Questions 17-20 are based on the case study. Each case study has 5 case-based sub-parts. An examinee is to attempt any 4 out of 5 sub-parts.

Part – B consists 16 questions

1. Question No 21 to 26 are Very short answer type questions of 2 mark each,

2. Question No 27 to 33 are Short Answer Type questions of 3 marks each

3. Question No 34 to 36 are Long Answer Type questions of 5 marks each.

4. Internal choice is provided in 2 questions of 2 marks, 2 questions of 3 marks and 1 question of 5 marks.

Part-A

1. Without actually performing the long division, Check whether $\frac{129}{2^2 5^7 7^5}$ will have terminating **[1]** decimal expansion or non-terminating repeating decimal expansion.

<div align="center">OR</div>

What is a composite number?

2. Is it quadratic equation ? **[1]**

$3x^2 - 2\sqrt{x} + 8 = 0$

3. Find the value of k for which the system 3x + ky = 7, 2x - 5y = 1 will have infinitely many **[1]** solutions.

4. What will be the distance between two parallel tangents to a circle of radius 5 cm? **[1]**

5. How many two-digit numbers are divisible by 3? **[1]**

<div align="center">OR</div>

If (2p - 1), 7, 3p are in A.P, find the value of p.

6. Find the Arithmetic Mean of (a - b) and (a + b). **[1]**

7. Find the roots of the quadratic equation $2x^2 - 2\sqrt{2}x + 1 = 0$, using the quadratic formula. **[1]**

<div align="center">OR</div>

Find the value of k for which the given quadratic equation has real and distinct roots: $5x^2 - kx + 1 = 0$

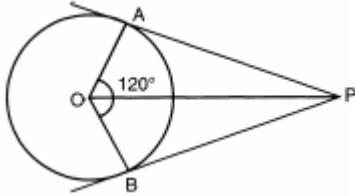BY PRIYAM TAYAL(Mail Id: priyamtayal234@gmail.com)

8. Write the name of the common point of the tangent to a circle and the circle. **[1]**

9. 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 $\angle BOC = 130°$, then find $\angle ACO$ **[1]**
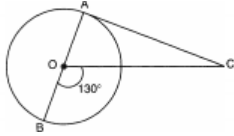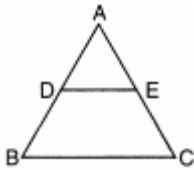

OR

In the figure, PA and PB are tangents to a circle with centre O. If $\angle AOB = 120°$, then find $\angle OPA$.

10. In given figure DE ∥ BC. If AD = 3 cm, DB = 4 cm and AE = 6 cm, then find EC. **[1]**

11. What is the sum of first n terms of the AP a, 3a, 5a,..... **[1]**

12. Find the value of $\cos 30° \cos 45° - \sin 30° \sin 45°$? **[1]**

13. If A, B, C are the interior angles of a triangle ABC, prove that: $\tan\frac{B+C}{2} = \cot\frac{A}{2}$. **[1]**

14. If a cone and a sphere have equal radii and equal volumes. What is the ratio of the diameter of the sphere to the height of cone? **[1]**

15. Find the 20th term of the A.P 9, 13, 17, 21,... **[1]**

16. 250 lottery tickets were sold and there are 5 prizes on these tickets. If Kunal has purchased one lottery ticket, what is the probability that he wins a prize? **[1]**

17. Students of a school are standing/seating in rows and columns in their playground for Yoga practice. A, B, C and D are the positions of four students as shown in the figure. **[4]**
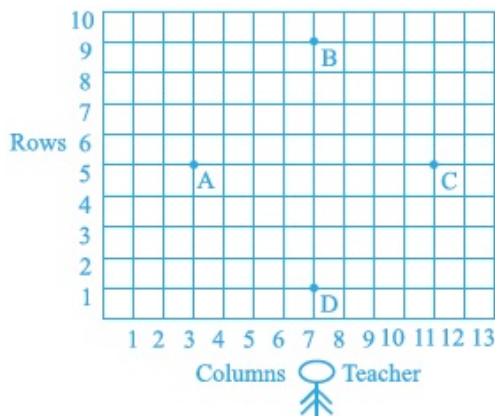
i. The positions of A, B respectively are:

    a. (3, 5), (8, 7)

    b. (3, 5), (9, 7)

    c. (3, 5), (7, 9)

    d. (5, 3), (7, 9)

ii. The distance between A and B is:

    a. $\sqrt{32}$ units

b. $\sqrt{23}$ units

c. $\sqrt{42}$ units

d. $\sqrt{35}$ units

iii. It is possible to place Jaspal in the drill in such a way that he is equidistant from each of the four students A, B, C and D then the Position of Jaspal is:

a. (3, 7)

b. (3, 5)

c. (5, 7)

d. (7, 5)

iv. The distance between A and C is

a. 8 units

b. 6 units

c. 4 units

d. $\sqrt{32}$ units

v. The positions of C and B respectively are:

a. (11, 5), (9, 7)

b. (11, 5), (7, 9)

c. (5, 11), (7, 9)

d. (11, 7), (5, 9)

18. Rahul is studying in X Standard. He is making a kite to fly it on a Sunday. Few questions came to his mind while making the kite. Give answers to his questions by looking at the figure. **[4]**

i. Rahul tied the sticks at what angles to each other?

a. 30⁰

b. 60⁰

c. 90⁰

d. 60⁰

ii. Which is the correct similarity criteria applicable for smaller triangles at the upper part of this kite?

a. RHS

b. SAS

c. SSA

d. AAS

iii. Sides of two similar triangles are in the ratio 4:9. Corresponding medians of these triangles are in the ratio:

   a. 2:3

   b. 4:9

   c. 81:16

   d. 16:81

iv. In a triangle, if the square of one side is equal to the sum of the squares of the other two sides, then the angle opposite the first side is a right angle. This theorem is called:

   a. Pythagoras theorem

   b. Thales theorem

   c. The converse of Thales theorem

   d. The converse of Pythagoras theorem

v. What is the area of the kite, formed by two perpendicular sticks of length 6 cm and 8 cm?

   a. 48 cm^2

   b. 14 cm^2

   c. 24 cm^2

   d. 96 cm^2

19. A Mall is constructing in the city, Jaipur. 100 workers are working in the Mall. The data of the distribution of weekly wages of 100 workers are recorded and the following graph is made: **[4]**

Based on the above graph, answer the following questions:

i. Identify less than type ogive from the given graph.

   a. A

   b. point of intersection of A and B

   c. B

   d. none of these

ii. Find the Median Wages.

   a. Rs.60

   b. Rs.150

   c. Rs.50

   d. Rs.55

iii. Find Mode of the data if Mean Wages is Rs. 50

   a. Rs.52

   b. Rs.60

c. Rs.55

d. Rs.50

iv. The construction of the cumulative frequency table is useful in determining the:

a. Median

b. Mean

c. Mode

d. All of the above

v. The intersection of the Ogive graph(abscissa) represents which of the following:

a. Mean

b. Median

c. Mode

d. All of these

20. Due to heavy floods in a state, thousands of people were homeless. 50 schools collectively **[4]** offered to the state government to provide the place and the canvas for 1500 tent to be fixed by the government and decided to share the whole expenditure equally. The lower part of each tent is cylindrical of base radius 2.8 m and height 3.5 m, with the conical upper part of the same base radius but of height 2.1 m. [use $\pi = \frac{22}{7}$]
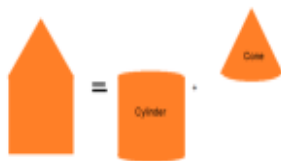
i. Area of canvas used to make the tent is

a. TSA of cylindrical portion + CSA of the conical portion

b. CSA of cylindrical portion + CSA of the conical portion

c. CSA of cylindrical portion + TSA of the conical portion

d. TSA of cylindrical portion + TSA of the conical portion

ii. The volume of the tent is

a. $\pi r^2 \left(\frac{1}{3} r + h \right)$ cubic units

b. $\frac{1}{3} \pi r^2 (r + h)$ cubic units

c. $\frac{4}{3} \pi r^2 h$ cubic units

d. none of these

iii. If the canvas used to make the tent cost ₹120 per sq.m, find the amount to be paid by the schools for making the tents.

    a. ₹ 11098

    b. ₹ 88889

    c. ₹ 11088

    d. ₹ 99998

iv. Amount shared by each school to set-up the tents.

    a. ₹ 442640

    b. ₹ 222640

    c. ₹ 332640

    d. ₹ 552640

v. According to the given information, what is the ratio of the curved surface area of the cylindrical portion to the conical portion:

    a. 1:2

    b. 2:3

    c. 4:1

    d. 2:1

Part-B

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

22. If G (-2, 1) is the centroid of a $\triangle$ABC and two of its vertices are A(1, -6) and B(-5, 2), find the third vertex of the triangle. **[2]**

OR

Prove that the coordinates of the centroid of a triangle ABC, with vertices A(x_1, y_1), B(x_2, y_2) and C(x_3, y_3) are given by $\left(\frac{x_1 + x_2 + x_3}{3}, \frac{y_1 + y_2 + y_3}{3} \right)$.

23. If α and β are the zeroes of a polynomial $x^2 - 4\sqrt{3}\,x + 3$, then find the value of $\alpha + \beta - \alpha\beta$ **[2]**

24. Draw a circle of radius 4cm with centre O. Draw a diameter POQ. Through P or Q draw a tangent to the circle. **[2]**

25. If $\sin 3A = \cos(A - 26^\circ)$, where 3A is an acute angle, find the value of A. **[2]**

OR

If sin (A + B) = 1 and sin (A -B) = $\frac{1}{2}$, $0 \leq$ A + B = 90° and A > B, then find A and B.

26. Two concentric circles of radii a and b (a >b) are given. Find the length of the chord of the larger circle which touches the smaller circle. **[2]**

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

28. Solve: $3^{(x+2)} + 3^{-x} = 10$ **[3]**

OR

Find the values of k for which the given equation has real and equal roots:

$x^2 + k(4x + k - 1) + 2 = 0$

29. Find the zeroes of the polynomial $v^2 + 4\sqrt{3}v - 15$ by factorisation method and verify the relationship between the zeroes and coefficient of the polynomials. **[3]**

30. In the given figure, the line segment XY is parallel to side AC of $\triangle ABC$ and it divides the triangle into two parts of equal area. Prove that **[3]**

$$AX : AB = (2 - \sqrt{2}) : 2$$
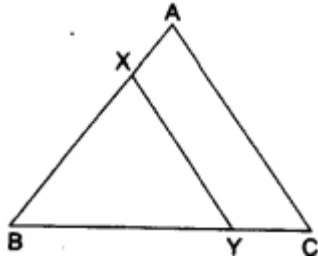
OR

In the adjoining figure, ABCD is a trapezium in which $CD \parallel AB$ and its diagonals intersect at O. If AO = (5x - 7) cm, OC = (2x+1)cm, DO = (7x- 5) cm and OB = (7x + 1)cm, find the value of x.
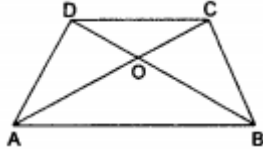
31. A box consists of 100 shirts of which 88 are good, 8 have minor defects and 4 have major **[3]** defects. Ramesh, a shopkeeper will buy only those shirts which are good but 'Kewal' another shopkeeper will not buy shirts with major defects. A shirt is taken out of the box at random. What is the probability that:

    i. Ramesh will buy the selected shirt?
    ii. 'Kewal' will buy the selected shirt?

32. As observed from the top of a light-house, 100 m high above sea level, the angle of depression **[3]** of a ship, sailing directly towards it, changes from 30° to 60⁰ . Determine the distance travelled by the ship during the period of observation. (Use $\sqrt{3}$ = 1.732)

33. The weight of coffee in 70 packets are shown in the following table. **[3]**

Weight (in g)	200-201	201-202	202-203	203-204	204-205	205-206
No. of packets	12	26	20	9	2	1

Determine the modal weight.

34. Four equal circles are described at the four corners of a square so that each touches two of the **[5]** others. The shaded area enclosed between the circles is $\frac{24}{7} \text{cm}^2$. Find the radius of each circle.

35. A shopkeeper sells a saree at 8% profit and a sweater at 10% discount, thereby getting a sum **[5]** of ₹ 1008. If she had sold the saree at 10% profit and the sweater at 8% discount, she would have got ₹ 1028. Find the cost price of the saree and the list price (price before discount) of the sweater.

36. The angle of elevation of the top of a chimney from the top of a tower is 60° and the angle of **[5]** depression of the foot of the chimney from the top of the tower is 30°. If the height of the tower is 40 m, find the height of the chimney. According to pollution control norms, the minimum height of a smoke emitting chimney should be 100 m. State if the height of the above-mentioned chimney meets the pollution norms. What value is discussed in this question?