

UNIQUE STUDY POINT

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Class: VI	Subject: Mathematics	Session: 2025-26
Chapter: 08 - Playing with Constructions	Time: 1½ Hours	Max. Marks: 40

General Instructions:

1. All questions are compulsory.
2. This question paper contains 20 questions divided into five sections A, B, C, D and E.
3. Section A contains 10 MCQs of 1 mark each.
4. Section B contains 4 questions of 2 marks each.
5. Section C contains 3 questions of 3 marks each.
6. Section D contains 1 question of 5 marks.
7. Section E contains 2 Case Study Based questions of 4 marks each.

SECTION A - Multiple Choice Questions (1 mark each)

Q.1. What is the distance from the center of a circle to any point on the circle called?

- (a) Diameter
- (b) Radius
- (c) Circumference
- (d) Chord

Q.2. In a rectangle, opposite sides are:

- (a) Unequal
- (b) Equal
- (c) Perpendicular
- (d) Parallel and unequal

Q.3. All angles in a square measure:

- (a) 45°
- (b) 60°
- (c) 90°
- (d) 180°

Q.4. A curve that joins all points at a fixed distance from a center point is called:

- (a) Line
- (b) Circle
- (c) Square
- (d) Rectangle

Q.5. How many sides does a rectangle have?

- (a) 3
- (b) 4
- (c) 5
- (d) 6

Q.6. In a square, all sides are:

- (a) Unequal
- (b) Equal
- (c) Only two sides equal
- (d) None of these

Q.7. The line segment joining opposite corners of a rectangle is called:

- (a) Side
- (b) Angle
- (c) Diagonal
- (d) Radius

Q.8. Which instrument is primarily used to draw a circle?

- (a) Ruler
- (b) Protractor
- (c) Compass
- (d) Set square

Q.9. If a square is rotated, it remains a:

- (a) Rectangle
- (b) Circle
- (c) Square
- (d) Triangle

Q.10. The two diagonals of a rectangle are:

- (a) Unequal
- (b) Equal
- (c) Perpendicular
- (d) Parallel

SECTION B - Short Answer Questions (2 marks each)

Q.11. Define the terms 'center' and 'radius' of a circle with the help of a diagram.

Q.12. State the two properties that define a rectangle.

Q.13. Write the two properties that define a square.

Q.14. If one side of a square is 5 cm, what is the length of each of its other sides? Why?

SECTION C - Short Answer Questions (3 marks each)

Q.15. Explain with steps how you would construct a circle of radius 4 cm using a compass and ruler.

Q.16. Draw a rectangle ABCD with sides $AB = 6$ cm and $BC = 4$ cm. Mark its diagonals and measure their lengths. What do you observe?

Q.17. Can a rectangle be divided into two identical squares? If yes, what condition must the sides of the rectangle satisfy? Explain with an example.

SECTION D - Long Answer Question (5 marks)

Q.18. Construct a rectangle PQRS where one side $PQ = 5$ cm and the diagonal $PR = 7$ cm. Write all the steps of construction clearly and verify that your construction satisfies the properties of a rectangle.

Q.19. Case Study 1: Garden Design

A gardener wants to design a rectangular garden plot. He plans to place a circular fountain in the center. The garden measures 8 m by 6 m, and the fountain has a radius of 2 m.

Based on this information, answer the following questions:

- (a) What is the perimeter of the rectangular garden? (1 mark)
- (b) What is the diameter of the circular fountain? (1 mark)
- (c) If the gardener wants to place four small square flower beds of side 1 m each at the four corners of the garden, what will be the total area covered by these flower beds? (2 marks)

Q.20. Case Study 2: Art Class

In an art class, students are given the task of creating a design using a compass and ruler. Riya draws a square ABCD with side 6 cm. She then draws circles with centers at each corner of the square (A, B, C, D) and radius equal to the side of the square (6 cm).

Based on this activity, answer the following:

- (a) What is the length of each diagonal of the square? (1 mark)
- (b) How many circles does Riya draw in total? (1 mark)
- (c) Will the circle centered at A pass through corner C? Justify your answer with reasoning. (2 marks)

SECTION A - Answers to MCQs

1. (b) Radius

The distance from the center of a circle to any point on the circle is called the radius.

2. (b) Equal

In a rectangle, opposite sides are equal in length.

3. (c) 90°

All angles in a square measure 90° .

4. (b) Circle

A circle is the curve that joins all points at a fixed distance from a center point.

5. (b) 4

A rectangle has 4 sides.

6. (b) Equal

In a square, all four sides are equal.

7. (c) Diagonal

The line segment joining opposite corners of a rectangle is called a diagonal.

8. (c) Compass

A compass is the primary instrument used to draw a circle.

9. (c) Square

When a square is rotated, it remains a square as rotation does not change its properties.

10. (b) Equal

The two diagonals of a rectangle are equal in length.

SECTION B - Answers to Short Answer Questions

11.

Center: The fixed point from which all points on the circle are equidistant is called the center of the circle.

Radius: The distance between the center and any point on the circle is called the radius.

[Diagram should show a circle with center marked as 'O' and a line segment from O to any point on the circle marked as radius]

12.

The two properties that define a rectangle are:

R1: The opposite sides are equal in length.

R2: All angles are 90° .

13.

The two properties that define a square are:

S1: All sides are equal.

S2: All angles are 90° .

14.

If one side of a square is 5 cm, then each of its other sides will also be 5 cm.

Reason: By the property of a square, all four sides are equal in length.

SECTION C - Answers to Short Answer Questions

15.

Steps to construct a circle of radius 4 cm:

Step 1: Mark a point O on your paper. This will be the center of the circle.

Step 2: Open the compass and place it against a ruler. Adjust the distance between the compass point and pencil to exactly 4 cm.

Step 3: Place the pointed end of the compass on point O.

Step 4: Keeping the compass point fixed at O, rotate the pencil end around to draw a complete circle.

Step 5: The circle drawn has radius 4 cm.

16.

[Students should draw the rectangle and measure diagonals]

Construction: Draw rectangle ABCD with $AB = 6$ cm and $BC = 4$ cm.

Diagonals: Draw AC and BD.

Measurement: $AC = BD =$ approximately 7.2 cm

Observation: The two diagonals of a rectangle are equal in length.

17.

Yes, a rectangle can be divided into two identical squares.

Condition: The length of the rectangle must be exactly twice its breadth.

Example: A rectangle with length 8 cm and breadth 4 cm can be divided into two squares, each of side 4 cm. This is because $8 \text{ cm} = 2 \times 4 \text{ cm}$.

SECTION D - Answer to Long Answer Question

18.

Steps of Construction:

Step 1: Draw a line segment $PQ = 5$ cm.

Step 2: At point Q, construct a perpendicular line using a protractor or set square.

Step 3: With P as center and radius 7 cm, draw an arc to intersect the perpendicular line at point R.

Step 4: At point P, construct a perpendicular to PQ.

Step 5: With R as center and radius 5 cm, draw an arc to intersect the perpendicular from P at point S.

Step 6: Join R to S to complete the rectangle PQRS.

Verification:

- Measure PQ and RS (both should be 5 cm) ✓
- Measure QR and PS (should be equal) ✓
- Measure angles at P, Q, R, S (all should be 90°) ✓
- Measure diagonal PR (should be 7 cm) ✓

Therefore, PQRS is a rectangle.

SECTION E - Answers to Case Study Based Questions

19. Case Study 1: Garden Design

(a) Perimeter of rectangular garden = $2(\text{length} + \text{breadth})$
 $= 2(8 + 6) = 2 \times 14 = 28 \text{ m}$

(b) Diameter of circular fountain = $2 \times \text{radius}$
 $= 2 \times 2 = 4 \text{ m}$

(c) Area of one square flower bed = $\text{side} \times \text{side} = 1 \times 1 = 1 \text{ m}^2$
Total area covered by 4 flower beds = $4 \times 1 = 4 \text{ m}^2$

20. Case Study 2: Art Class

(a) In a square with side 6 cm, diagonal = $\text{side} \times \sqrt{2} = 6\sqrt{2} \text{ cm} \approx 8.49 \text{ cm}$

(b) Riya draws 4 circles in total (one at each corner).

(c) **No**, the circle centered at A will not pass through corner C.

Reasoning: The radius of the circle is 6 cm, but the distance from A to C (the diagonal) is $6\sqrt{2} \text{ cm} \approx 8.49 \text{ cm}$, which is greater than the radius. Therefore, point C lies outside the circle centered at A.

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