

# GRADE: 7

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SUBJECT: Practical Geometry

DURATION: 2½ hrs

MAX MARKS: 80

## DETAILED ANSWERS

### SECTION A ( $4 \times 10 = 40$ marks)

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#### 1. Choose the correct option:

a) A triangle can be constructed if:

- **Correct Answer:** (ii) The sum of any two sides is greater than the third side.

b) To construct a triangle using the **SSS criterion**, we need:

- **Correct Answer:** (i) Three sides.

c) The perpendicular bisector of a line segment:

- **Correct Answer:** (ii) Passes through the midpoint at  $90^\circ$ .
- d) A quadrilateral can be uniquely constructed if we know:

- **Correct Answer:** (iii) Four sides and one diagonal.

#### 2. Solve the following:

a) **Definition of Practical Geometry and Applications**

- **Definition:** Practical Geometry deals with the construction of geometrical figures such as lines, angles, triangles, and quadrilaterals using a ruler, compass, and protractor.
- **Real-life applications:**
  - **Architecture:** Constructing buildings with precise angles and measurements.
  - **Engineering:** Designing bridges, roads, and mechanical parts.

**b) Construction of Right-Angled Triangle:**

- Given: Hypotenuse = 7 cm, one leg = 5 cm.
- Steps:
  1. Draw a horizontal line and mark **A**.
  2. Using a compass, draw a perpendicular line at **A**.
  3. Mark **B** at 5 cm along the perpendicular.
  4. Using a compass, draw an arc of 7 cm from **B**.
  5. Where the arc intersects the base line, mark **C**.
  6. Join **A** to **C**.
  7.  $\Delta ABC$  is the required triangle.

**c) Construction of Perpendicular Bisector:**

- Given: Line segment **AB** = 8 cm.
- Steps:
  1. Draw **AB** = 8 cm.
  2. Set the compass more than half of **AB** and draw arcs above and below from **A** and **B**.
  3. Mark the intersection points as **P** and **Q**.
  4. Join **P** and **Q**.
  5. **PQ** is the required perpendicular bisector, and midpoint is **M**.

**3. Solve the following constructions:**

**a) Construction of Triangle ABC with AB = 6 cm, BC = 5 cm, AC = 4 cm:**

- Steps:
  1. Draw **AB** = 6 cm.
  2. From **A**, draw an arc of 4 cm.
  3. From **B**, draw an arc of 5 cm.
  4. Mark the intersection as **C**.
  5. Join **AC** and **BC**.
  6.  $\Delta ABC$  is the required triangle.

**b) Construction of Isosceles Triangle (Base = 6 cm, Sides = 7 cm):**

- Steps:
  1. Draw **BC** = 6 cm.

2. Draw arcs of 7 cm from B and C.
3. Mark the intersection as A.
4. Join AB and AC.
5.  $\triangle ABC$  is the required isosceles triangle.

c) Construction of a Parallelogram (6 cm  $\times$  4 cm,  $60^\circ$  angle):

- Steps:
  1. Draw AB = 6 cm.
  2. Draw  $\angle B = 60^\circ$ .
  3. Draw BC = 4 cm.
  4. Copy AB = 6 cm from C.
  5. Join AD = 4 cm.
  6. ABCD is the required parallelogram.

#### 4. TRUE or FALSE:

- a) False (Three angles do not determine a unique triangle.)
- b) True (Triangle inequality theorem.)
- c) False (Four sides alone do not determine a unique quadrilateral.)
- d) True (Angle bisector divides an angle into two equal angles.)

#### 5. Solve the following problems:

a) Construction of Triangle ABC (AB = 7 cm, BC = 5 cm,  $\angle B = 60^\circ$ ):

- Steps:
  1. Draw BC = 5 cm.
  2. Draw  $\angle B = 60^\circ$ .
  3. Measure AB = 7 cm and mark A.
  4. Join AC.
  5.  $\triangle ABC$  is the required triangle.

b) Construction of Rhombus (Diagonals = 8 cm, 6 cm):

- Steps:

1. Draw **AC = 8 cm**.
2. Draw perpendicular bisector of **AC**.
3. Mark points **B** and **D** at 3 cm along bisector.
4. Join **AB, BC, CD, DA**.
5. **ABCD** is the required rhombus.

c) **Construction of Triangle (Sides = 5 cm, 6 cm, 7 cm) with Altitude:**

- **Steps:**
  1. Construct  $\triangle ABC$  as in previous example.
  2. Draw perpendicular from **B** to **AC** using a compass.
  3. Mark intersection as **D**.
  4. **BD** is the required altitude.

## SECTION B ( $4 \times 10 = 40$ marks)

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### 6. Geometry-Based Questions:

- a) **Construction of Scalene Triangle (5 cm, 7 cm, 8 cm):** (Use SSS method)
- b) **Construction of  $60^\circ$  Angle:** (Use compass method)
- c) **Construction of Kite (Diagonals = 7 cm, 5 cm):** (Use perpendicular bisector method)

### 7. Construction of Quadrilaterals:

- a) **Square (Side = 6 cm):** (Use perpendicular bisector method)
- b) **Rectangle (7 cm  $\times$  4 cm):** (Use parallel lines method)
- c) **Trapezium (8 cm, 5 cm, Height = 4 cm):** (Use parallel lines method)

### 8. Real-Life Applications:

- a) **Triangle Construction (Map of Cities - Scale 1 cm = 1 km)**
- b) **Parallelogram Construction (Bridge Support - Scale 1 cm = 2 m)**
- c) **Trapezium Construction (Playground - Scale 1 cm = 2 m)**

## 9. HOTS:

- a) Construction of Median
- b) Construction of Rhombus (Side = 5 cm, Diagonal = 8 cm)
- c) Quadrilateral Construction and Measurement of Diagonal

## 10. Bonus Challenge Questions:

- a) Pentagon Construction (Side = 6 cm)
- b) Hexagon Construction (Side = 5 cm)
- c) Triangle Construction (Two Equal Sides 6 cm, Included Angle  $45^\circ$ )

**END OF SOLUTIONS**