Practical Geometry

MATHEMATICAL REASONING

- 1. Given below are the steps of construction to construct a quadrilateral ABCD where AB = 5.6 cm, BC = 4.1 cm, CD = 4.4 cm, AD = 3.3 cm and $\angle A = 75^{\circ}$. Which of the following steps is INCORRECT?
 - **Step 1:** Draw AB = 5.6 cm and construct $\angle BAX = 75^{\circ}$.
 - **Step 2:** With A as centre and radius = 3.3 cm, cut off AD = 3.3 cm along AX.
 - **Step 3:** Join BD. With D as centre and radius = 4.1 cm, draw an arc.
 - **Step 4:** With B as centre and radius = 4.1*cm*, draw an arc to cut the arc drawn in above step at C. Join BC, CD to obtain the required quadrilateral ABCD.
 - (a) Step 1 only
- (b) Step 2 only
- (c) Step 3 only
- (d) Step 4 only
- 2. It is possible to construct a quadrilateral with the sufficient data (other than five simple cases), where less than ____ parts but some other relations between them are given.
 - (a) Four
- (b) Five
- (c) Three
- (d) Two
- **3.** Arrange the steps of construction while constructing a parallelogram ABCD, given that AB = 5 cm, BC = 4 cm and $\angle B = 60^{\circ}$. 1. With A as centre and radius equal to 4 cm,
 - draw an arc cutting AY at D.
 - 2. At A, draw $\angle YAB = 120^{\circ}$.

$$[:: A + B = 180^{\circ}]$$

- 3. At B, draw $\angle XBA = 60^{\circ}$.
- 4. Draw AB = 5cm.
- 5. Join CD.
- 6. With B as centre and radius equal to 4 cm, drawn an arc cutting BX at C.
- (a) 4, 3, 6, 2, 1, 5
- (b) 4, 3, 2, 6, 5, 1
- (c) 4, 6, 3, 1, 2, 5
- (d) 4, 3, 6, 2, 5, 1

- **4.** Arrange the steps of construction while constructing a quadrilateral ABCD given AB = 5.1 cm, AO = 4 cm, BC = 2.5 cm, $\angle A = 60^{\circ}$ and $\angle B = 85^{\circ}$.
 - **Step 1:** With B as centre and radius 2.5 cm, cut off BC = 2.5 cm along BY.
 - **Step 2:** Construct $\angle XAB = 60^{\circ}$ at A.
 - Step 3: Join CD.
 - **Step 4:** With A as centre and radius 4cm, cut off AD = 4 cm along AX.
 - **Step 5:** Draw AB=5.1 cm.
 - **Step 6:** Construct $\angle ABY = 85^{\circ}$ at B.
 - (a) 5, 2, 4, 1, 3, 6
 - (b) 5, 4, 2, 1. 6, 3
 - (c) 5, 2, 4, 6, 1, 3
 - (d) 5, 2, 4, 1, 6, 3
- **5.** If $AB \parallel DC$, AB = 7cm, BC = 6cm, AD = 6.5cm and $\angle B = 70^{\circ}$, then which figure can be constructed?
 - (a) Square
- (b) Trapezium
- (c) Rhombus
- (d) Rectangle
- **6.** Given below are the steps of construction of a quadrilateral ABCD, where AB = 3.5 cm, BC = 6.5 cm, $\angle A = 75^{\circ}$, $\angle B = 105^{\circ}$ and $\angle C = 120^{\circ}$. Which of the following steps is INCORRECT?
 - **Step 1:** Draw AB = 3.5cm.
 - **Step 2:** Draw $\angle XAB = 75^{\circ}$ at A and $\angle ABY = 105^{\circ}$ at B.
 - **Step 3:** With B as centre and radius $BC = 6.5 \ cm$, draw an arc to intersect BV at C.
 - **Stap4:** At C, draw $\angle ADC = 120^{\circ}$ such that CZ meets AX at D.
 - (a) Step 1 only
 - (b) Step 2 only
 - (c) Step 3 only
 - (d) Step 4 only

- **7.** To construct a kite, which of the following is necessary?
 - (a) Two adjacent unequal sides and included diagonal
 - (b) Two adjacent equal sides and included diagonal
 - (c) Length of opposite sides
 - (d) None of these
- 8. Which of the following statements is true about the construction of a quadrilateral where AB = 3 cm, BC = 5 cm, AC = 9 cm, AD = 6 cm. CD = 2 cm?
 - (a) It is possible to draw the quadrilateral.
 - (b) It is not possible to draw the quadrilateral, since $AD \div DC < AC$.
 - (c) It is possible to draw the quadrilateral, since AD + DC < AC
 - (d) None of these
- **9.** To construct a quadrilateral ABCD, which of the following parts is necessary?
 - (a) Length of AB
 - (b) Length of BC
 - (c) Measure of $\angle A$, $\angle B$ and $\angle C$
 - (d) All of these
- **10.** Which of the given properties of a parallelogram is necessary to construct it?
 - (a) Opposite sides of a parallelogram
 - (b) Opposite angles of a parallelogram
 - (c) Diagonals of a parallelogram
 - (d) Both (a) and (b)

ACHIEVERS SECTION (HOTS)

- 11. Arrange the steps of construction while constructing a quadrilateral ABCD given AB = 5.3 cm, AD = 2.9 cm, $\angle A = 70^{\circ}$, $\angle B = 95^{\circ}$ and $\angle C = 85^{\circ}$.
 - **Step 1:** With A as centre and radius 2.9 cm, draw an arc to cut AX at D.
 - **Step 2:** At B, draw \angle ZBA=95° so that ZB intersects YD at C,
 - **Step 3:** Draw AB= 5.3cm.

Step4: At D draw $\angle DY = 110^{\circ}$

Step 5: At A draw $\angle XAB = 70^{\circ}$.

- (a) 3, 4, 2, 1, 5
- (b) 3, 5, 1, 4, 2
- (c) 3, 1, 5, 4, 2
- (d) 3. 5, 4, 2, 1
- **12.** Match the following.

Column – I	Column – II			
(P) Construction of a	(1) two unequal sides			
quadrilateral can be	and included diagonal			
possible if at least	are given			
(Q) Construction of	(2) Five independent			
quadrilateral must	elements are given			
satisfy				
(R) A kite can be drawn	(3) 4 sides, 4 angles and			
if its	2 diagonals			
(S) A quadrilateral has	(4) triangle inequality			
	and angle sum property			
	of a triangle.			

	Р	Q	R	S
(a)	3	2	4	1
(b)	3	4	2	1
(c)	2	4	1	3
(d)	4	3	1	2

13. Arrange the steps (i) to (iv) in correct order, while constructing a parallelogram ABCD, given $\overline{AB} = 6 \ cm$, $\overline{AD} = 4 \ cm$, and diagonal $\overline{BD} = 3 \ cm$.

Step 1: Draw $\overline{AB} = 6 \ cm$

Step (i): Join \overline{AD} and \overline{BD} .

Step (ii): With A as centre, draw an arc of radius 4 cm.

Step (iii): With B and D as centres and with 4 cm and 6 cm as radii, respectively, draw arcs to cut each other at C.

Step (iv): With B as centre, draw an arc of radius 3 cm to cut the arc drawn in step (ii) at point D.

Step 6: Join \overline{CD} and \overline{BC} , ABCD is the required parallelogram.

- (a) (ii), (iv), (iii), (i)
- (b) (iii), (ii), (v), (iv)
- (c) (ii), (iv), (i), (iii)
- (d) None of these

- **14.** To construct a convex quadrilateral, which of the following cases is INCORRECT?
 - (a) When the lengths of four sides and one diagonal are given,
 - (b) When the lengths of three sides and the two diagonals are given.
 - (c) When the lengths of four sides and one angle are given,
 - (d) When the lengths of two sides and two included angles are given.
- **15.** Which of the following steps is INCORRECT while constructing a rhombus ABCD, given that AC = 8 cm and BD = 6 cm?

Step 1: Draw AC=8 cm.

Step 2: Draw PQ, the perpendicular of AC. PQ intersects AC at point O.

Step 3: With O as centre and radius equal to 3 cm, drawn an arc cutting OP at D.

Step 4: With O as centre and radius equal to 3 cm, draw another arc cutting OQ at B.

Step 5: Join AB, BC, CD and DA.

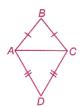
- (a) Step 2 only
- (b) Step 3 only
- (c) Step 4 only
- (d) Both Step 2 and Step 5

ANSWER KEY								
1.	С	2.	В	3 .	Α	4.	С	5. B
6.	D	7.	Α	8.	В	9.	D	10. D
11.	В	12.	С	13.	Α	14.	D	15. A

HINTS & EXPLANATIONS

- **1.** (c): Step III is incorrect since with D as centre CD is drawn with radius = 4.4 cm.
- **2.** (b):
- **3.** (a):
- **4.** (c):
- **5.** (b) : To construct a quadrilateral, knowledge of at least five elements is necessary.

- **6.** (d) : The correct step is : At C, $\angle ACD = 120^{\circ}$ draw such that CZ meets AX at D.
- **7.** (a) : Two adjacent unequal sides and included diagonal means two unequal sides and diagonal from common vertex, i.e., sides AB, AD and diagonal AC are given.



- **8.** (b) : Here, it is given that AD + DC < AC which does not satisfy triangle inequality and hence quadrilateral cannot be drawn,
- **9.** (d) : To construct a quadrilateral measure of at least five parts is necessary. In case of quadrilateral ABCD, if length of AB. BC and measure of $\angle A$, $\angle B$, $\angle C$ is required.
- **10.** (d):
- **11.** (b) :
- **12.** (c) :
- **13.** (a) :
- **14.** (d):
- **15.** (a) :