CREST Olympiads

#CRESTInnovator

# CREST Mathematics Olympiad (CMO)

# Worksheet for

## Class 9

**Topic**

## Construction

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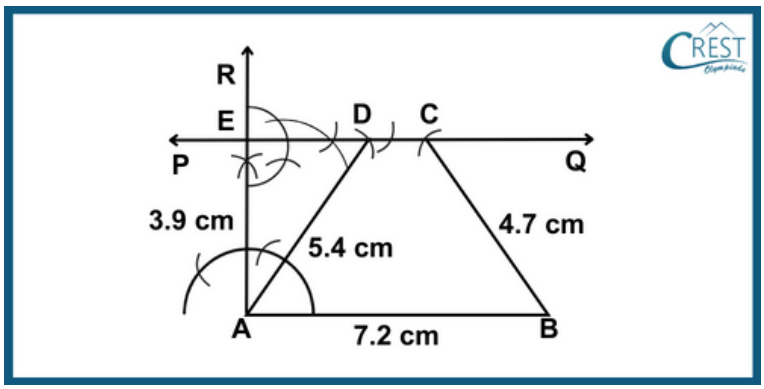
# Worksheet on Construction

1. **Which of the following is the correct arrangement of steps for constructing trapezium ABCD?**



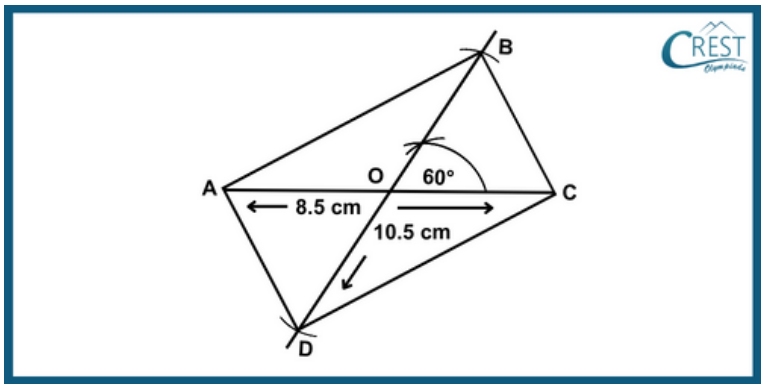

**Steps for construction of trapezium ABCD are as follows:**

1. From point A, draw a ray AR, making a 90° angle with AB. Mark off a segment AE of length 3.9 cm along this ray.
2. Connect vertices A and D and vertices B and C to form the trapezium ABCD.
3. From vertex B, use a compass with a radius of 4.7 cm to draw another arc.
4. From vertex A, use a compass with a radius of 5.4 cm to draw an arc.
5. Draw a line segment AB with a length of 7.2 cm.
6. The intersections of these arcs with line PQ are vertices D and C.
7. At vertex E, draw a line PQ parallel to the line segment AB.

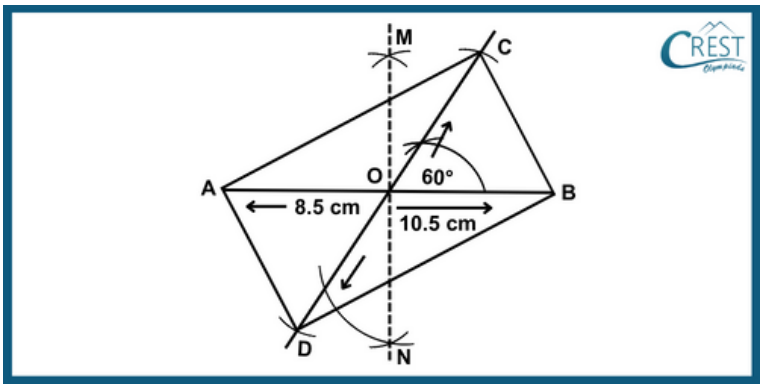
a. 5 → 1 → 7 → 3 → 4 → 6 → 2
b. 5 → 1 → 7 → 4 → 3 → 6 → 2
c. 4 → 1 → 7 → 5 → 3 → 6 → 2
d. 5 → 1 → 3 → 4 → 7 → 6 → 2

2. **Use a ruler and compass to construct a parallelogram with diagonals 8.5 cm and 10.5 cm in length that has an acute angle between them is 60°. Which of the following is the correct construction?**

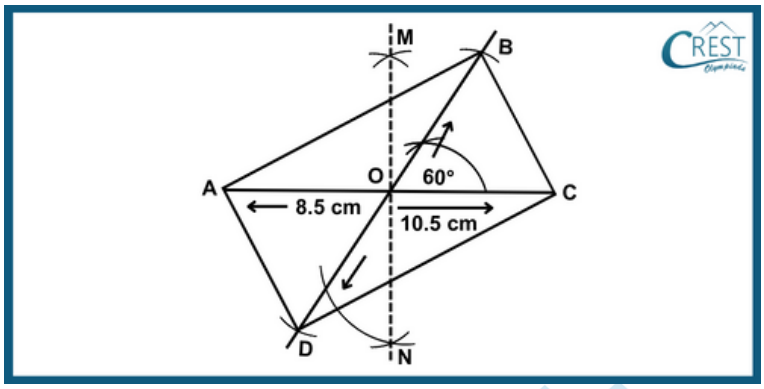
a.



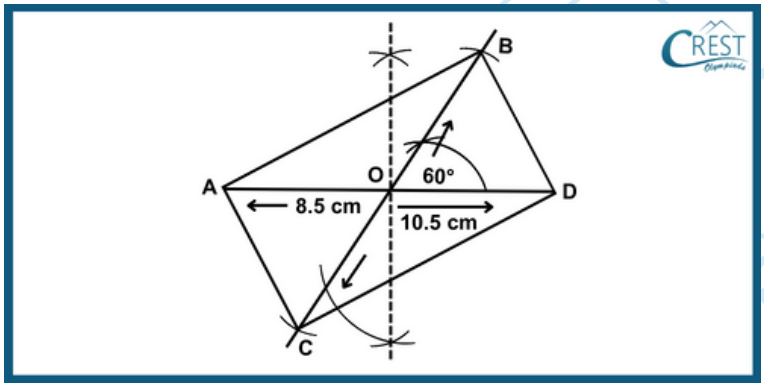
b.



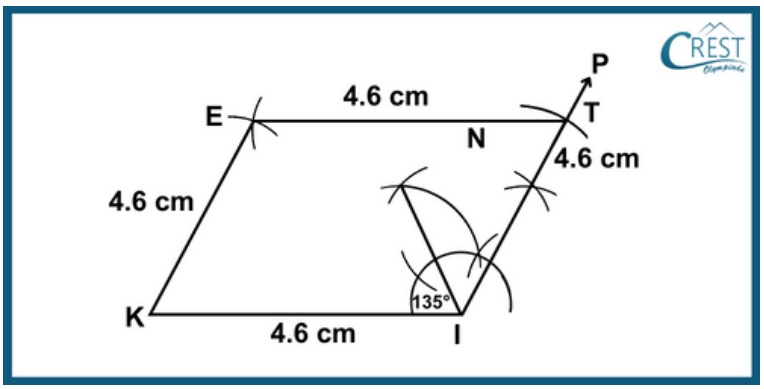

c.




d.

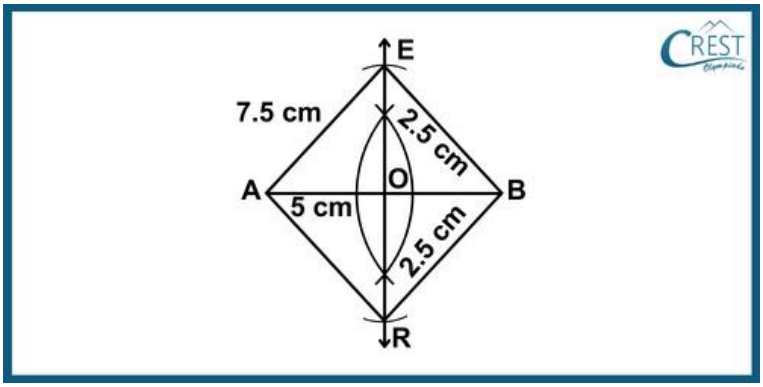



3. **Which of the following is NOT correct for a quadrilateral KITE whose construction is shown below?**



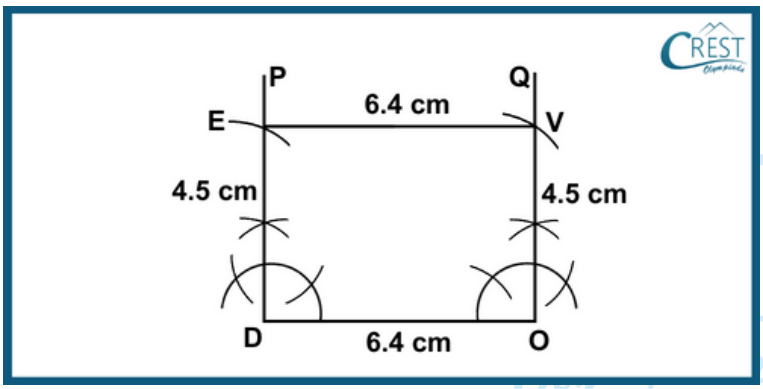

a. KITE is a rhombus in which ∠KIT is 135°.
b. KITE is a rhombus in which ∠KET is 135°.
c. KITE is a rhombus in which ∠IKE is 45°.
d. KITE is a rhombus in which ∠KIE is 45°.

4. **Which of the following is correct for a quadrilateral BEAR with diagonal AB = 5 cm and ∠BAE = 45° whose construction is shown below?**




a. BEAR is a rhombus in which AB is perpendicular to ER.
b. BEAR is a square in which AB is perpendicular to ER.
c. BEAR is a rhombus in which AB is not perpendicular to ER.
d. BEAR is a square in which AB is not perpendicular to ER.

5. **Identify the incorrect statements for the following construction of quadrilateral DOVE.**




**A: Dove is a rectangle in which EV is perpendicular to QO.**
**B: Dove is a rectangle in which EV is perpendicular to DO.**
**C: Dove is a parallelogram in which EV is perpendicular to QO.**
**D: Dove is a parallelogram in which EV is perpendicular to DO.**

a. A, B and D
b. A, C and D
c. B, C and D
d. B, C and A

## Answer Key

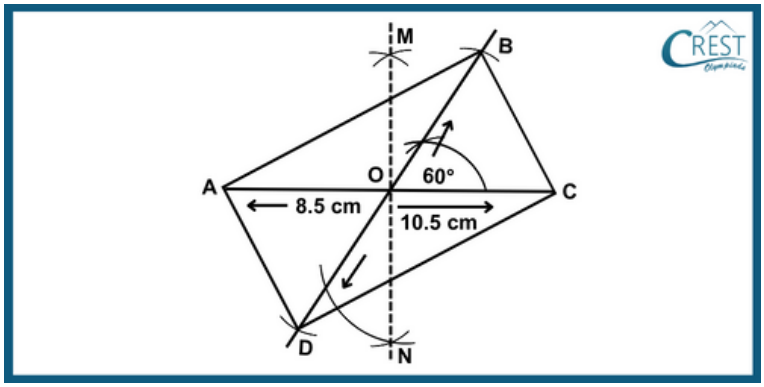
**1.** b - 5 → 1 → 7 → 4 → 3 → 6 → 2

**Explanation:** Steps for construction of trapezium ABCD are as follows:

i. Draw a line segment AB with a length of 7.2 cm.
ii. From point A, draw a ray AR, making a 90° angle with AB. Mark off a segment AE of length 3.9 cm along this ray.

iii. At vertex E, draw a line PQ parallel to the line segment AB.
iv. From vertex A, use a compass with a radius of 5.4 cm to draw an arc.
v. From vertex B, use a compass with a radius of 4.7 cm to draw another arc.
vi. The intersections of these arcs with line PQ are vertices D and C.
vii. Connect vertices A and D and vertices B and C to form the trapezium ABCD.

**2.** c -




**Explanation:** Steps for construction of parallelogram ABCD are as follows:

i. Begin by drawing a line segment AC with a length of 8.5 cm.
ii. Identify the midpoint O of AC as diagonals of a parallelogram bisect each other. Draw perpendicular MN to get the vertex O.
iii. Draw an angle of 60° at vertex O.
iv. From point O, cut OB at 5.25 cm and from point O, cut OD at 5.25 cm.
v. Connect vertices A, B, C and D to complete the construction of the required parallelogram ABCD.

**3.** d - KITE is a rhombus in which ∠KIE is 45°.

**Explanation:** KITE is a rhombus in which ∠KIE is half of 135° which is 67.5°.

**4.** b - BEAR is a square in which AB is perpendicular to ER.

**Explanation:** Diagonal AB is the bisector of ∠A. If ∠BAE = 45°, the ∠RAB = 45°.
∠BAE + ∠RAB = 45° + 45°
∴ ∠A = 90°
All sides are equal to 7.5. Both diagonal AB and ER are perpendicular to each other and equal to 5 cm.
Hence, BEAR is a square in which AB is perpendicular to ER.

**5.** c - B, C and D

**Explanation:** Dove is a rectangle whose adjacent angles (∠D and ∠O) are 90° and whose opposite sides are equal.
Dove is a rectangle in which EV is perpendicular to QO.
Only statement A is correct. Statements B, C and D are incorrect statements.

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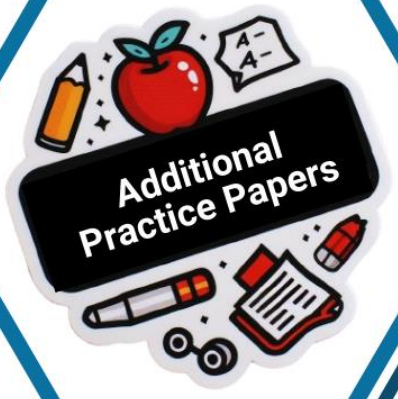


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