# Propositions and their Converses

Standard difficulty · 20 questions · 40 marks · Time: 37 minutes

Name: _____ Date: _____ Score: ____ / 40

Show your working for Sections B and C. Answers are on the last page — try every question first!

## Section A — Choose the correct answer — 8 × 1 = 8 marks

**1.** A proposition is a statement that is:

**(a)** a question **(b)** an opinion

**(c)** always true **(d)** either true or false, but not both

**2.** The converse of 'If two sides of a triangle are equal, then the angles opposite them are equal.' is:

**(a)** If two angles of a triangle are equal, then the sides opposite them are equal.

**(b)** If two sides of a triangle are equal, then the angles opposite them are equal.

**(c)** If $a^2 = b^2$, then a = b.

**(d)** If $x^2 = 9$, then x = 3.

**3.** A triangle has sides 80 cm, 84 cm and 116 cm. It is:

**(a)** acute-angled **(b)** not a triangle **(c)** obtuse-angled **(d)** right-angled

**4.** In $\triangle ABC$, $\angle B = \angle C = 43°$ and AB = 6 cm. Then AC =

**(a)** 8 cm **(b)** 12 cm

**(c)** 6 cm **(d)** cannot be found

**5.** Which number is a counterexample to 'If a number is divisible by 5, then it is divisible by 15'?

**(a)** 50 **(b)** 90 **(c)** 75 **(d)** 120

**6.** Which test tells us two lines are parallel?

**(a)** equal distances at one point only

**(b)** equal lengths

**(c)** a right angle at one end

**(d)** equal corresponding angles made by a transversal

**7.** In quadrilateral ABCD, $\angle A = 51°$. For ABCD to be cyclic, $\angle C$ must be:

**(a)** 129° **(b)** 39° **(c)** 51° **(d)** 309°

**8.** A transversal cuts lines l and m. Two co-interior angles are 68° and 112°. Then:

**(a)** $l \parallel m$ **(b)** $l \perp m$

**(c)** l and m meet on the side of these angles **(d)** l and m meet on the other side

## Section B — Short answer — 8 × 2 = 16 marks

**9.** Write the converse of: 'If two triangles are congruent, then their areas are equal.' Is the converse true?

**10.** Check whether a triangle with sides 12 cm, 16 cm, 21 cm is right-angled.

**11.** Show by a counterexample that 'If a number is divisible by 6 and by 9, then it is divisible by 54' is false.

**12.** In $\triangle DEF$, $\angle F = 22°$ and $\angle D = 79°$. Which two sides are equal?

**13.** A quadrilateral has angles $\angle A = 116°$, $\angle B = 91°$, $\angle C = 59°$ and $\angle D = 94°$. Is it cyclic?

**14.** In $\triangle ABC$, D is the midpoint of AB, and the line through D parallel to BC meets AC at E. If AC = 22 cm and BC = 32 cm, find AE and DE.

**15.** A transversal cuts lines l and m. Two alternate interior angles are $(5x - 7)°$ and $(2x + 65)°$. For which value of x is $l \parallel m$?

**16.** Can a triangle have angles 48°, 36° and 96°?

## Section C — Word problems — 4 × 4 = 16 marks

**17.** Rahul marks 40 cm along one wall and 42 cm along the other from a corner. The distance between the marks is 59 cm. Is the corner a right angle? If not, is it more or less than 90°?

**18.** Vikram claims: 'If the product of two whole numbers is a multiple of 8, then one of the numbers is a multiple of 8.' Is this true? If false, give a counterexample.

**19.** A flowerbed ABCD has ∠A = 105°, ∠B = 109° and ∠C = 69°. Find ∠D. Can a circular fence pass through all four corners?

**20.** In a triangular park ABC, a straight path starts at the midpoint D of side AB and runs parallel to BC until it meets AC at E. If BC = 360 m and AC = 400 m, how long is the path and how far is E from A?

**Want another sheet on this chapter?** In the Ambiful Worksheets app every sheet is new, with its answer key, and your child never gets the same question twice.
Scan the code to get the free app, or open **worksheets.ambiful.com/get**

# Answer key

Propositions and their Converses · AW-9M-PRP-2026-V1 · For parents — fold back or tear off before handing the sheet to your child.

| Q | Answer | Working |
|---|---|---|
| 1 | **(d) either true or false, but not both** | — |
| 2 | **(a) If two angles of a triangle are equal, then the sides opposite them are equal.** | swap the hypothesis and the conclusion |
| 3 | **(d) right-angled** | $80^2 + 84^2 = 13456 = 116^2$ |
| 4 | **(c) 6 cm** | sides opposite equal angles are equal |
| 5 | **(a) 50** | 50 = 5 × 10, but 50 ÷ 15 leaves remainder 5 |
| 6 | **(d) equal corresponding angles made by a transversal** | the converse of the corresponding angles property |
| 7 | **(a) 129°** | opposite angles of a cyclic quadrilateral add up to 180°: 180° − 51° |
| 8 | **(a) l ∥ m** | 68° + 112° = 180° |
| 9 | **If two triangles have equal areas, then they are congruent. False.** | False: right triangles with legs 2 and 6, and 3 and 4, both have area 6 |
| 10 | **No, it is obtuse-angled** | $12^2 + 16^2 = 400 < 21^2 = 441$ |
| 11 | **180 is divisible by 6 and 9, but not by 54** | 180 = 6 × 30 = 9 × 20, but 180 ÷ 54 leaves remainder 18; it works because 6 and 9 share the factor 3 |
| 12 | **DF = EF** | ∠E = 180° − 22° − 79° = 79°, so ∠D = ∠E and the sides opposite them are equal |
| 13 | **No** | ∠A + ∠C = 175°, not 180° |
| 14 | **AE = 11 cm, DE = 16 cm** | E is the midpoint of AC (converse of the mid-point theorem), so AE = 22 ÷ 2; then DE = ½ BC = 32 ÷ 2 |
| 15 | **x = 24** | l ∥ m when the alternate angles are equal: 5x − 7 = 2x + 65 gives x = 24, and each angle is 113° |
| 16 | **Yes** | 48° + 36° + 96° = 180° |
| 17 | **No, it is more than 90°** | $40^2 + 42^2 = 3364 < 59^2 = 3481$ |
| 18 | **False: 4 × 4 = 16** | 16 = 8 × 2, but neither 4 nor 4 is a multiple of 8 |
| 19 | **∠D = 77°; no** | ∠D = 360° − 105° − 109° − 69° = 77°; ∠A + ∠C = 174°, not 180° |
| 20 | **DE = 180 m, AE = 200 m** | converse of the mid-point theorem: E is the midpoint of AC, and DE = ½ BC |



Ambiful Worksheets · worksheets.ambiful.com · Not affiliated with CBSE / NCERT 