EXERCISE 10.6 PAGE NO: 10.66

Question 1: In Δ ABC, if ∠ A = 40° and ∠ B = 60°. Determine the longest and shortest sides of the triangle.

Solution: In Δ ABC, ∠ A = 40° and ∠ B = 60°

We know the sum of angles in a triangle = 180°

∠ A + ∠ B + ∠ C = 180°

40° + 60° + ∠ C = 180°

∠ C = 180° – 100° = 80°

∠ C = 80°

Now, 40° < 60° < 80°

=> ∠ A < ∠ B < ∠ C

=> ∠ C is a greater angle and ∠ A is a smaller angle.

Now, ∠ A < ∠ B < ∠ C

We know the side opposite to a greater angle is larger, and the side opposite to a smaller angle is smaller.

Therefore, BC < AC < AB

AB is the longest and BC is the shortest side.

Question 2: In a Δ ABC, if ∠ B = ∠ C = 45°, which is the longest side?

Solution: In Δ ABC, ∠ B = ∠ C = 45°

The sum of angles in a triangle = 180°

∠ A + ∠ B + ∠ C = 180°

∠ A + 45° + 45° = 180°

∠ A = 180° – (45° + 45°) = 180° – 90° = 90°

∠ A = 90°

=> ∠ B = ∠ C < ∠ A

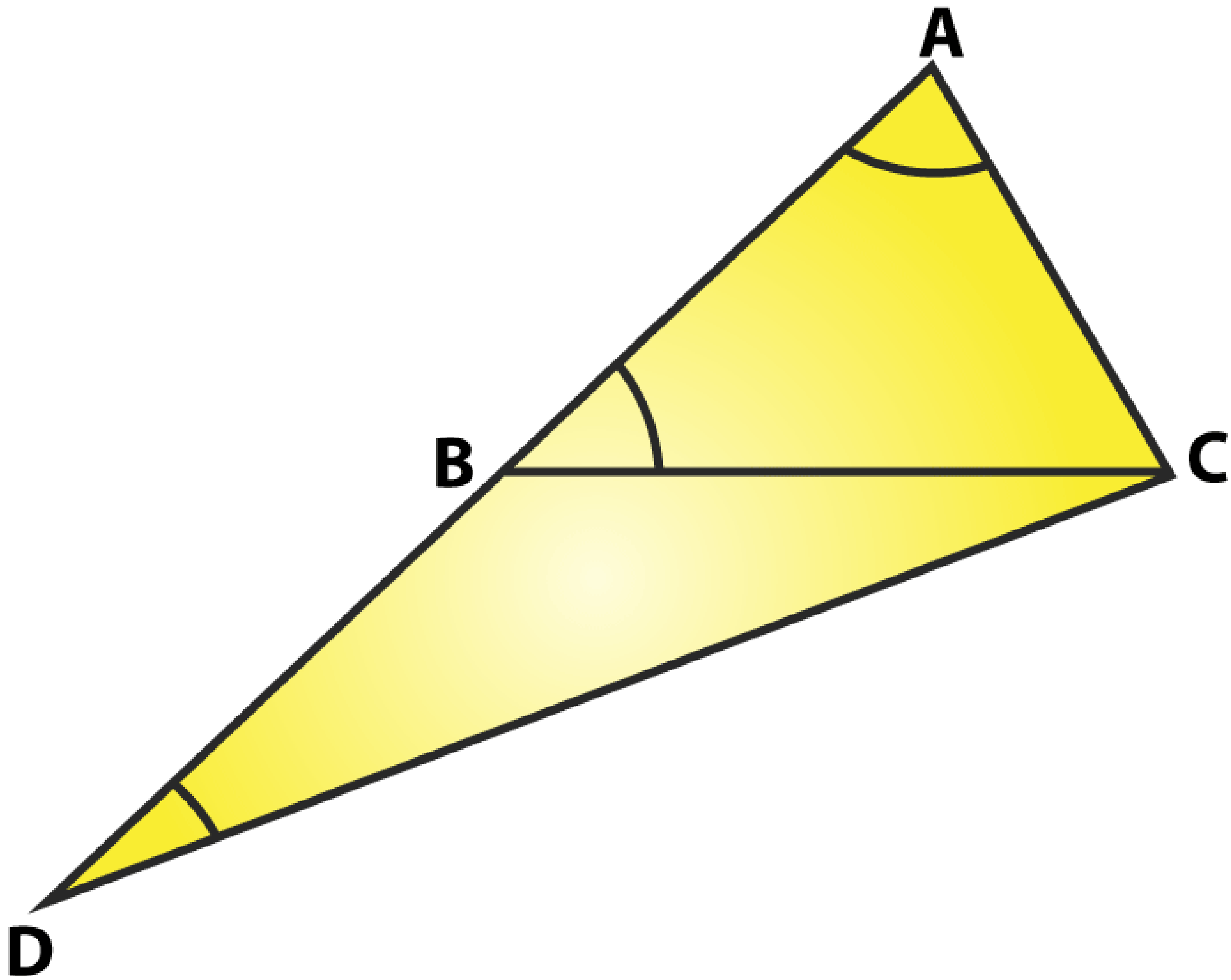
Therefore, BC is the longest side.

Question 3: In Δ ABC, side AB is produced to D so that BD = BC. If ∠ B = 60° and ∠ A = 70°.

Prove that: (i) AD > CD (ii) AD > AC

Solution: In Δ ABC, side AB is produced to D so that BD = BC.

∠ B = 60°, and ∠ A = 70°



To prove: (i) AD > CD (ii) AD > AC

Construction: Join C and D

We know the sum of angles in a triangle = 180°

∠ A + ∠ B + ∠ C = 180°

70° + 60° + ∠ C = 180°

∠ C = 180° – (130°) = 50°

∠ C = 50°

∠ ACB = 50° ……(i)

And also in Δ BDC

∠ DBC =180° – ∠ ABC = 180 – 60° = 120°

[∠DBA is a straight line]

and BD = BC [given]

∠ BCD = ∠ BDC [Angles opposite to equal sides are equal]

The sum of angles in a triangle =180°

∠ DBC + ∠ BCD + ∠ BDC = 180°

120° + ∠ BCD + ∠ BCD = 180°

120° + 2∠ BCD = 180°

2∠ BCD = 180° – 120° = 60°

∠ BCD = 30°

∠ BCD = ∠ BDC = 30° ….(ii)

Now, consider Δ ADC.

∠ DAC = 70° [given]

∠ ADC = 30° [From (ii)]

∠ ACD = ∠ ACB+ ∠ BCD = 50° + 30° = 80° [From (i) and (ii)]

Now, ∠ ADC < ∠ DAC < ∠ ACD

AC < DC < AD

[Side opposite to the greater angle is longer, and the smaller angle is smaller]
AD > CD and AD > AC

Hence proved.

Question 4: Is it possible to draw a triangle with sides of length 2 cm, 3 cm and 7 cm?

Solution:

Lengths of sides are 2 cm, 3 cm and 7 cm.

A triangle can be drawn only when the sum of any two sides is greater than the third side.

So, let's check the rule.

$2 + 3 \ngtr 7$ or $2 + 3 < 7$

$2 + 7 > 3$

and $3 + 7 > 2$

Here $2 + 3 \ngtr 7$

So, the triangle does not exist.