Board – CBSE	Class – 7th	Topic – Properties of Triangle

Q.1 In a ΔABC, if ∠A = 72° and ∠B = 63°, find ∠C.

Ans: Sum of the angles of a triangle is 180°.

∴∠A+∠B+∠C = 180°

72° + 63° +∠C = 180°

∠C = 45°

Hence, ∠C measures 45°.

Q.2 Find the angles of a triangle which are in the ratio 4 : 3 : 2.

Ans: Suppose the angles of the triangle are $(4x)^o$, $(3x)^o$ and $(2x)^o$.

Sum of the angles of any triangle is 180^o.

∴ 4x + 3x + 2x = 180

9x = 180

x = 20

Therefore, the angles of the triangle are (4×20)°, (3×20)° and (2×20)°,

i.e. 80°, 60° and 40°.

Q.3 One of the acute angles of a right triangle is 36°. find the other.

Ans: Sum of the angles of a triangle is 180°.

Suppose the other angle measures x.

It is a right angle triangle. Hence, one of the angle is 90°.

∴ 36° + 90° +x = 180°

x= 54°

Hence, the other angle measures 54°.

Q.4 Each of the two equal angles of an isosceles triangle is twice the third angle. Find the angles of the triangle.

Ans: Suppose the third angle of the isosceles triangle is x^o.

Then, the two equal angles are $(2x)^o$ and $(2x)^o$.

Sum of the angles of any triangle is 180^o.

$\therefore 2x + 2x + x = 180$

$5x = 180$

$x = 36$

Hence, the angles of the triangle are 36°, (2×36)° and (2×36)°, i.e. 36°, 72°and 72°

Q.5 In a ΔABC, if $2\angle A = 3\angle B = 6\angle C$, calculate ∠A, ∠B and ∠C.

Ans: Suppose: $2\angle A = 3\angle B = 6\angle C = x^{\circ}$

Then, $\angle A = \left(\frac{x}{2}\right)^{\circ}$

$\angle B = \left(\frac{x}{3}\right)^{\circ}$ *and* $\angle C = \left(\frac{x}{6}\right)^{\circ}$

Sum of the angles of any triangle is 180°.

$\angle A + \angle B + \angle C = 180°$

$\Rightarrow \frac{x}{2} + \frac{x}{3} + \frac{x}{6} = 180°$

$\Rightarrow \frac{3x+2x+x}{6} = 180°$

$\Rightarrow \frac{6x}{6} = 180°$

$\Rightarrow x = 180°$

$\therefore \angle A = \left(\frac{180}{2}\right)^{\circ} = 90°,\ \angle B = \left(\frac{180}{3}\right)^{\circ} = 60°,\ \angle C = \left(\frac{180}{6}\right)^{\circ} = 30°$

Q.6 What is the measure of each angle of an equilateral triangle?

Ans: We know that the angles of an equilateral triangle are equal.

Let the measure of each angle of an equilateral triangle be x°.

$\therefore x + x + x = 180$

$x = 60°$.

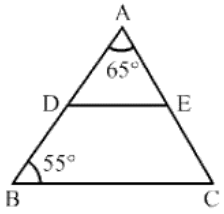
Hence, the measure of each angle of an equilateral triangle is 60°.

Q.7 In the given figure, DE || BC. If ∠A = 65° and ∠B° = 55, find ∠ADE

Ans: DE ∥ BC

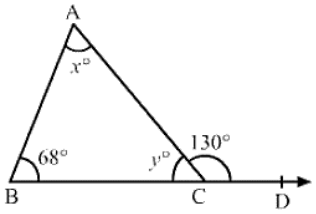
$\therefore \angle ABC = \angle ADE = 55°$

(Corresponding angles)



Q.8 In the figure given alongside, find the values of x and y.

Ans: We know that the exterior angle of a triangle is equal to the sum of the interior opposite angles.



$\therefore \angle BAC + \angle ABC = \angle ACD$

$x + 68 = 130$

$x = 62$

Sum of the angles in any triangle is 180°.

$\therefore \angle BAC + \angle ABC + \angle ACB = 180°$

$62 + 68 + y = 180$

$y = 50$

Q.9 An exterior angle of a triangle measures 110° and its interior opposite angles are in the ratio 2 : 3. Find the angles of the triangle.

Ans: Suppose the interior opposite angles are $(2x)°$ and $(3x)°$.

We know that the exterior angle of a triangle is equal to the sum of the interior opposite angles.

$\therefore 3x + 2x = 110$

$x = 22$

The interior opposite angles are $(2\times22)°$ and $(3\times22)°$, i.e. 44° and 66°.

Suppose the third angle of the triangle is y°.

Now, sum of the angles in any triangle is 180°.

$\therefore 44 + 66 + y = 180$

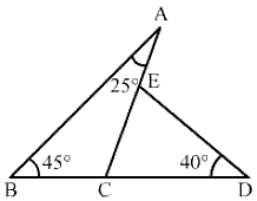
$y = 70$

Hence, the angles of the triangle are 44°, 66° and 70°.

Q.10 In the figure given alongside, find: ∠ACD

Ans: We know that the exterior angle of a triangle is equal to the sum of the interior opposite angles.

In △ABC:



$\angle ACD = \angle BAC + \angle ABC = 25° + 45°$

$\angle ACD = 70°$

Q.11 Two sides of a triangle are 5 cm and 9 cm long. What can be the length of its third side?

Ans: Let the length of the third side be x cm.

Sum of any two sides of a triangle is greater than the third side.

$\therefore 5 + 9 > x$

$\Rightarrow x < 14$

Hence, the length of the third side must be less than 14 cm.

Q.12 The two legs of a right triangle are equal and the square of its hypotenuse is 50. Find the length of each leg.

Ans: Suppose the length of the two legs of the right triangle are a cm and a cm.

Then, by Pythagoras theorem:

$a^2 + a^2 = 50$

$\Rightarrow 2a^2 = 50$

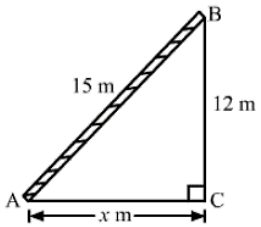
$\Rightarrow a^2 = 25$

$\Rightarrow a = \sqrt{25}$

$\Rightarrow a = 5$

Hence, the length of each leg is 5 cm.

Q.13 A 15-m-long ladder is placed against a wall to reach a window 12 m high. Find the distance of the foot of the ladder from the wall.



Ans: By Pythagoras theorem in $\triangle ABC$:

$AB^2 = AC^2 + BC^2$

$15^2 = x^2 + 12^2$

$\Rightarrow x^2 = 225 - 144$

$\Rightarrow x^2 = 81$

$\Rightarrow x^2 = 9^2$

$\Rightarrow x = 9$

$\therefore$ x = 9 cm

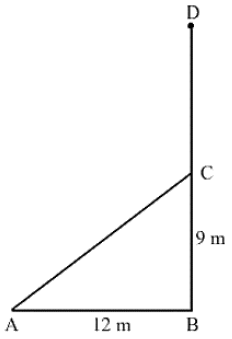
Hence, the distance of the foot of the ladder from the wall is 9 cm.

Q.14 A tree is broken by the wind but does not separate. If the point from where it breaks is 9 m above the ground and its top touches the ground at a distance of 12 m from its foot, find out the total height of the tree before it broke.

Ans: Let BD be the height of the tree broken at point C and suppose CD take the position CA

Now as per given conditions we have AB = 9 m , BC = 12 m

By Pythagoras theorem:



$AC^2 = AB^2 + BC^2$

$\Rightarrow AC^2 = 12^2 + 9^2$

$\Rightarrow AC^2 = 144 + 81$

$\Rightarrow AC^2 = 225$

$\Rightarrow AC^2 = 15^2$

$\Rightarrow AC = 15$

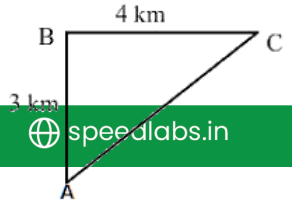
Length of the tree before it broke = AC + AB

= 15 + 9

= 24 m

Q.15 A man goes 3 km due north and then 4 km due east. How far is he away from his initial position?

Ans: Suppose the man starts from A and goes 3 km north and reaches B.



He then goes 4 km towards east and reaches C.

$\therefore$ AB = 3 km

BC = 4 km

We have to find AC.

By Pythagoras theorem:

$\Rightarrow AC^2 = AB^2 + BC^2$

$\Rightarrow AC^2 = 3^2 + 4^2$

$\Rightarrow AC^2 = 25$

$\Rightarrow AC^2 = 5^2$

$\Rightarrow AC = 5km$

Hence, he is 5 km far from the initial position.