SpeedLabs

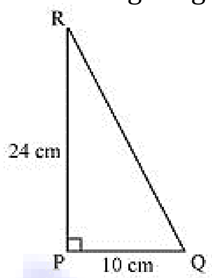
MATHS

CBSE 7th

TEEVRA EDUTECH PVT. LTD.

Q.1 PQR is a triangle right angled at P. If PQ = 10 cm and PR = 24 cm, find QR.

Sol:



By applying Pythagoras theorem in ΔPQR,

$(PQ)^2 + (PR)^2 = (RQ)^2$

$(10)^2 + (24)^2 = RQ^2$

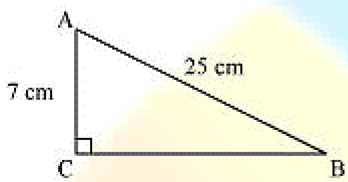
$100 + 576 = (QR)^2$

$676 = (QR)^2$

QR = 26 cm

Q.2 ABC is a triangle right angled at C. If AB = 25 cm and AC = 7 cm, find BC.

Sol:



By applying Pythagoras theorem in ΔABC,

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

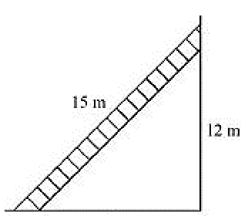
$(BC)^2 = (AB)^2 - (AC)^2$

$(BC)^2 = (25)^2 - (7)^2$

$(BC)^2 = 625 - 49 = 576$

BC = 24 cm

Q.3 A 15 m long ladder reached a window 12 m high from the ground on placing it against a wall at a distance a. Find the distance of the foot of the ladder from the wall.



Sol: By applying Pythagoras theorem,

$(15)^2 = (12)^2 + a^2$

$225 = 144 + a^2$

$a^2 = 225 - 144 = 81$

$a = 9$ m

Therefore, the distance of the foot of the ladder from the wall is 9 m.

Q.4 Which of the following can be the sides of a right triangle?

(i) 2.5 cm, 6.5 cm, 6 cm

(ii) 2 cm, 2 cm, 5 cm

(iii) 1.5 cm, 2 cm, 2.5 cm

In the case of right-angled triangles, identify the right angles.

Sol: (i) 2.5 cm, 6.5 cm, 6 cm

$(2.5)^2 = 6.25$

$(6.5)^2 = 42.25$

$(6)^2 = 36$

It can be observed that,

$36 + 6.25 = 42.25$

$(6)^2 + (2.5)^2 = (6.5)^2$

The square of the length of one side is the sum of the squares of the lengths of the remaining two sides. Hence, these are the sides of a right-angled triangle. Right angle will be in front of the side of 6.5 cm measure.

(ii) 2 cm, 2 cm, 5 cm

$(2)^2 = 4$

$(2)^2 = 4$

$(5)^2 = 25$

Here, $(2)^2 + (2)^2 \neq (5)^2$

The square of the length of one side is not equal to the sum of the squares of the lengths of the remaining two sides. Hence, these sides are not of a right-angled triangle.

(iii) 1.5 cm, 2 cm, 2.5 cm

$(1.5)^2 = 2.25$

$(2)^2 = 4$

$(2.5)^2 = 6.25$

Here,

$2.25 + 4 = 6.25$

$(1.5)^2 + (2)^2 = (2.5)^2$

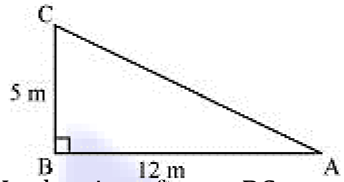
The square of the length of one side is the sum of the squares of the lengths of the remaining two sides.

Hence, these are the sides of a right-angled triangle.

Right angle will be in front of the side of 2.5 cm measure.

Q.5 A tree is broken at a height of 5 m from the ground and its top touches the ground at a distance of 12 m from the base of the tree. Find the original height of the tree.

Sol:



In the given figure, BC represents the unbroken part of the tree. Point C represents the point where the tree broke and CA represents the broken part of the tree. Triangle ABC, thus formed, is right-angled at B.

Applying Pythagoras theorem in ΔABC,

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

$AC^2 = (5\text{ m})^2 + (12\text{ m})^2$

$AC^2 = 25\text{ m}^2 + 144\text{ m}^2 = 169\text{ m}^2$

$AC = 13\text{ m}$

Thus, original height of the tree = AC + CB = 13 m + 5 m = 18 m

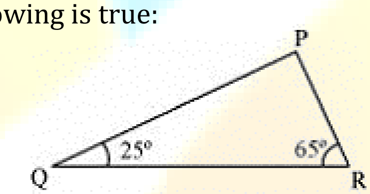
Q.6 Angles Q and R of a ΔPQR are 25° and 65°.

Write which of the following is true:

(i) $PQ^2 + QR^2 = RP^2$

(ii) $PQ^2 + RP^2 = QR^2$

(iii) $RP^2 + QR^2 = PQ^2$



Sol: The sum of the measures of all interior angles of a triangle is 180º.

$\angle PQR + \angle PRQ + \angle QPR = 180°$

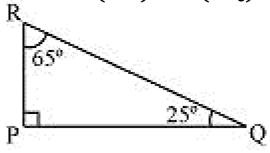
$25° + 65° + \angle QPR = 180°$

$90° + \angle QPR = 180°$

$\angle QPR = 180° - 90° = 90°$

Therefore, Δ PQR is right-angled at point P.

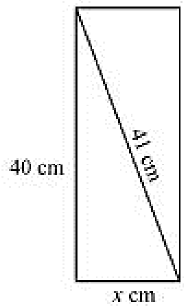
Hence, $(PR)^2 + (PQ)^2 = (QR)^2$



Thus, (ii) is true.

Q.7 Find the perimeter of the rectangle whose length is 40 cm and a diagonal is 41 cm.

Sol:



In a rectangle, all interior angles are of 90º measure. Therefore, Pythagoras theorem can be applied here.

$(41)^2 = (40)^2 + x^2$

$1681 = 1600 + x^2$

$x^2 = 1681 - 1600 = 81$

$x = 9$ cm

Perimeter = 2(Length + Breadth)

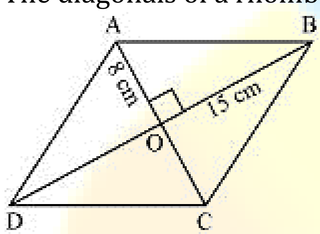
Perimeter = $2(x + 40)$

Perimeter = $2\ (9 + 40)$

Perimeter = 98 cm

Q.8 The diagonals of a rhombus measure 16 cm and 30 cm. Find its perimeter.

Sol:



Let ABCD be a rhombus (all sides are of equal length) and its diagonals, AC and BD, are intersecting each other at point O. Diagonals in a rhombus bisect each other at 90°. It can be observed that

$AO = \frac{AC}{2} = \frac{16}{2} = 8$ cm

$BD = \frac{BD}{2} = \frac{30}{2} = 15$ cm

By applying Pythagoras theorem in Δ AOB,

$OA^2 + OB^2 = AB^2$

$8^2 + 15^2 = AB^2$

$64 + 225 = AB^2$

$289 = AB^2 \Rightarrow AB = 17$

Therefore, the length of the side of rhombus is 17 cm.

Perimeter of rhombus = $4 \times$ Side of the rhombus = $4 \times 17 = 68$ cm