2. PYTHAGORAS THEOREM

Que. 1 (A). Choose the correct alternative from those given below

(1 mark each)

1. Out of given triplets, which is a Pythagoras triplet ?

(A) (1,5,10) (B) (3,4,5) (C) (2,2,2) (D) (5,5,2)

2. Out of given triplets, which is not a Pythagoras triplet ?

(A) (5,12,13) (B) (8,15,17) (C) (7,8,15) (D) (24,25,7)

3. Out of given triplets, which is not a Pythagoras triplet ?

(A) (9,40,41) (B) (11,60,61) (C) (6,14,15) (D) (6,8,10)

4. In right angled triangle, if sum of square of sides of right angle is 169 then what is the length of hypotenuse?

(A) 15 (B) 13 (C) 5 (D) 12

5. A rectangle having length of a side is 12 and length of diagonal is 20 then what is length of other side?

(A)2 (B) 13 (C) 5 (D) 16

6. If the length of diagonal of square is $\sqrt{2}$ then what is the length of each side ?

(A)2 (B)$\sqrt{3}$ (C) 1 (D) 4

7. If length of both diagonals of rhombus are 60 and 80 then what is the length of side?

(A)100 (B)50 (C) 200 (D) 400

8. If length of sides of triangle are a ,b, c and $a^2 + b^2 = c^2$ then which type of triangle it is ?

(A)Obtuse angled triangle (B) Acute angled triangle

(C) Equilateral triangle **(**D)Right angled triangle

9. In ΔABC, AB = $6\sqrt{3}$ cm, AC = 12 cm, and BC = 6 cm then m∠A = ?

(A)30^0 (B) 60^0 (C) 90^0 (D) 45^0

10. The diagonal of a square is 10 $\sqrt{2}$ cm then its perimeter is ..... .

(A)10 cm. (B) $40\sqrt{2}$ cm. (C) 20 cm. (D) 40 cm.

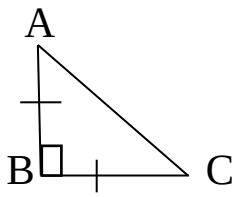
11. Out of all numbers from given dates, which is a Pythagoras triplet ?

(A)15/8/17 (B)16/8/16 (C) 3/5/17 (D) 4/9/15

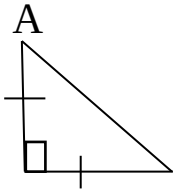
Que. 1 (B). Solve the following questions : (1 mark each)

1.Height and base of a right angled triangle are 24 cm and 18 cm find the length of its hypotenus ?

2. From given figure, In Δ ABC, AB⊥ BC, AB =BC then m ∠A = ?

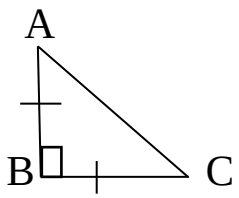


3. From given figure, In Δ ABC, AB⊥ BC, AB =BC, AC = $2\sqrt{2}$ then l (AB) = ?



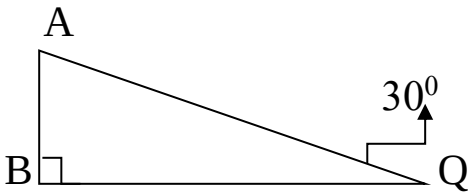
B C

4. From given figure, In Δ ABC, AB⊥BC, AB =BC, AC = $5\sqrt{2}$ then what is the height of Δ ABC ?



5. Find the height of an equilateral triangle having side 4 cm. ?

6. From given figure, In Δ ABQ, If AQ = 8 cm. then AB = ?



7. In right angled triangle, if length of hypotenuse is 25 cm. and height is 7 cm. then what is the length of its base ?

8. If a triangle having sides 50 cm., 14 cm, and 48 cm., then state wheather given triangle is right angled triangle or not.

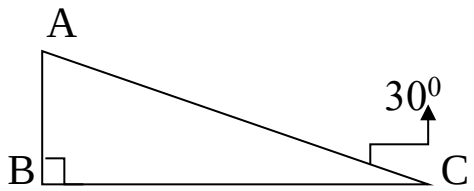
9. If a triangle having sides 8 cm., 15 cm., and 17 cm., then state wheather given triangle is right angled triangle or not.

10. A rectangle having dimensions 35 m X 12 m, then what is the length of its diagonal ?

Que. 2 (A). Complete the following activities (2 marks each)

*** (Write complete answers, don't just fill the boxes)**

1. From given figure, In Δ ABC, If AC = 12 cm. then AB = ?



Activity : From given figure, In Δ ABC, ∠ ABC = 90^0, ∠ ACB = 30^0

∴ ∠ **BAC =** ☐

∴ ΔABC is 30^0– 60^0– 90^0 Δ.

∴ In ΔABC by Property of 30^0– 60^0– 90^0 Δ.

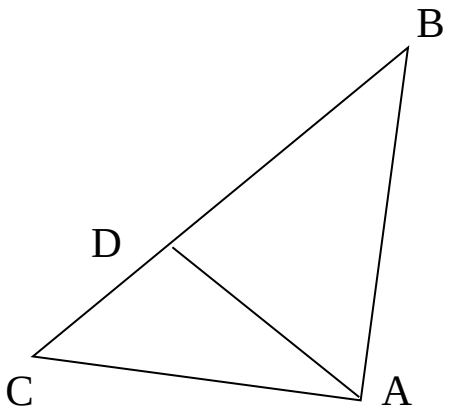
∴AB = $\frac{1}{2}$AC and ☐ = $\frac{\sqrt{3}}{2}$ AC.

∴ ☐ = $\frac{1}{2} \times 12$ And BC = $\frac{\sqrt{3}}{2} \times 12$

∴ ☐ = 6 व BC = $6\sqrt{3}$.

2. From given figure, In ΔABC, AD⊥BC, then prove that

$AB^2+CD^2 = BD^2 + AC^2$ by completing activity.



Activity : From given figure, In Δ ABC, By pythagoras theorem

$AC^2 = AD^2 +$ ☐

∴ $AD^2 = AC^2 – CD^2$….. (I)

Also, In ΔABD, by pythagoras theorem,

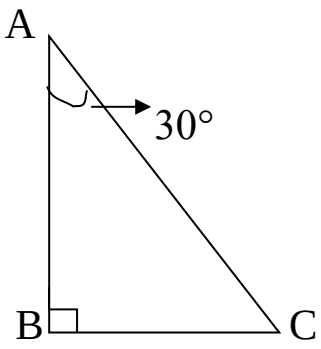
$AB^2 =$ ☐ $+BD^2$

∴ $AD^2 = AB^2 – BD^2$…..…. (II)

$\therefore$ $\square$ $- BD^2 = AC^2 -$ $\square$

$\therefore$ $AB^2+CD^2 = AC^2+ BD^2$

3. From given figure, In Δ ABC, If $\angle ABC = 90^0$ $\angle CAB=30^0$, AC = 14 then for finding value of AB and BC, complete the following activity.



Activity : In Δ ABC, If $\angle ABC = 90^0$ $\angle CAB=30^0$

$\therefore \angle BCA =$ $\square$

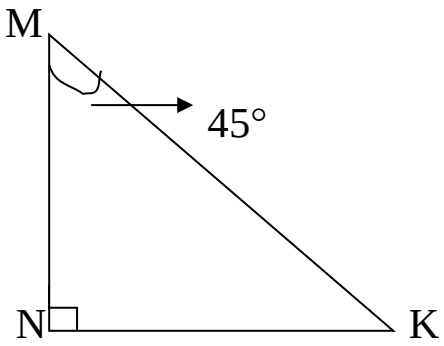
By theorem of $30^0 – 60^0 – 90^0$ Δ^{le},

$\therefore$ $\square$ $= \frac{1}{2}AC$ and $\square$ $= \frac{\sqrt{3}}{2}AC$

$\therefore BC = \frac{1}{2} \times$ $\square$ & $AB = \frac{\sqrt{3}}{2} \times 14$

$\therefore BC = 7$ & $AB = 7\sqrt{3}$.

4. From given figure, In Δ MNK, If $\angle MNK = 90^0$ $\angle M=45^0$, MK = 6 then for finding value of MK and KN, complete the following activity.



Activity : In Δ MNK, If ∠MNK = 90^0 ∠ M=45^0 ...(given)

∴ ∠ K = ☐ .... (remaining angles of Δ MNK)

By theorem of 45^0– 45^0– 90^0 Δ^{le},

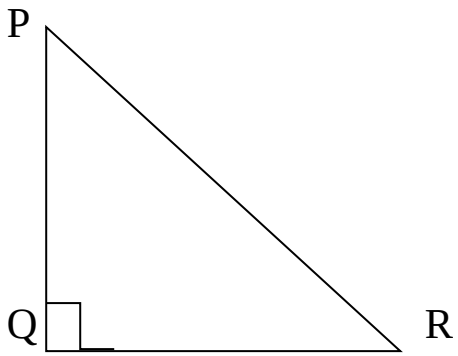
∴ ☐ = $\frac{1}{\sqrt{2}}$ MK and ☐ = $\frac{1}{\sqrt{2}}$ MK

∴ MN = $\frac{1}{\sqrt{2}}$ × ☐ & KN = $\frac{1}{\sqrt{2}}$ × 6

∴ MN = $3\sqrt{2}$. & KN = $3\sqrt{2}$.

5. A ladder 10 m long reaches a window 8m above the ground. Find the distance of the foot of the ladder from the base of wall. Complete the given activity.

Activity : as shown in fig. suppose



PR is the length of ladder = 10 m

At P – window, At Q – base of wall, At R – foot of ladder

∴ PQ = 6 m

∴ QR = ?

In ΔPQR , m $\angle PQR = 90^0$

By Pythagoras Theorem,

$\therefore PQ^2 +$ [ ] $= PR^2$…… (I)

Here, PR =10 , PQ = [ ]

From equation (I)

$8^2 + QR^2 = 10^2$

$QR^2 = 10^2 - 8^2$

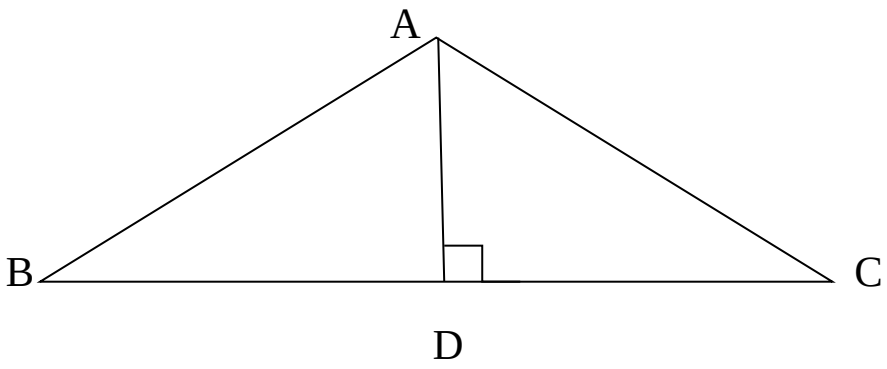
$QR^2 = 100 – 64$

$QR^2 =$ [ ]

QR =6

∴ The distance of foot of the ladder from the base of wall is 6 m.

6. From the given figure, In Δ ABC, If AD⊥BC, $\angle C = 45^0$, AC = $8\sqrt{2}$, BD = 5 then for finding value of AD and BC, complete the following activity.



Activity : In Δ ADC, If ∠ADC = 90^0 ∠ C=45^0 ... (given)

∴ ∠ DAC = ☐ .... (remaining angles of Δ ADC)

By theorem of 45^0– 45^0– 90^0 Δ^{le},

∴ ☐ = $\frac{1}{\sqrt{2}}$ AC and ☐ = $\frac{1}{\sqrt{2}}$ AC

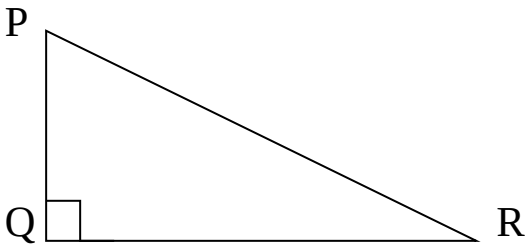
∴ AD = $\frac{1}{\sqrt{2}} \times$ ☐ & DC = $\frac{1}{\sqrt{2}} \times 8\sqrt{2}$

∴ AD = 8 & DC = 8

∴BC =BD +DC = 5 + 8 = 13

7. Complete the following activity to find the length of hypotenuse of right angled triangle, if sides of right angle are 9 cm and 12 cm.

Activity : In ΔPQR , m ∠PQR = 90^0



By Pythagoras Theorem,

$\therefore PQ^2 +$ ☐ $= PR^2 \ldots\ldots$ (I)

$\therefore PR^2 = 9^2 + 12^2$

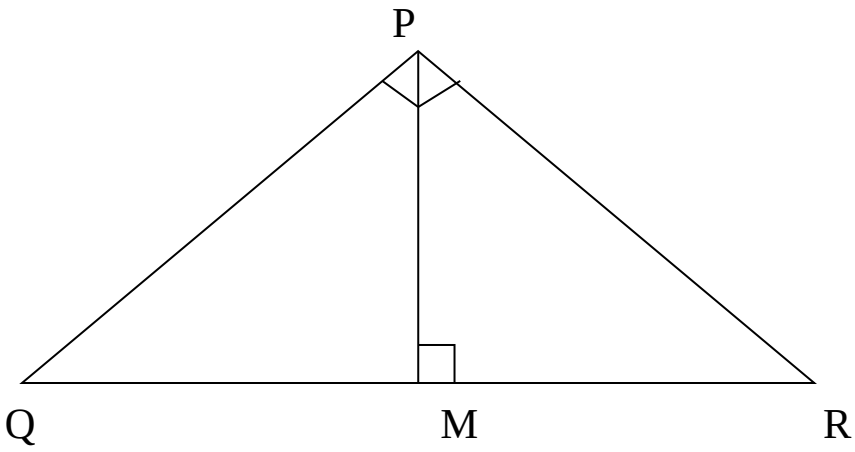
$\therefore PR^2 =$ ☐ $+ 144$

$\therefore PR^2 =$ ☐

$\therefore PR = 15$

$\therefore$ Length hypotenuse of triangle PQR is ☐ cm.

8. From given figure, In Δ PQR, If $\angle QPR = 90^0$, PM $\perp$QR, PM = 10, QM = 8 then for finding the value of QR, complete the following activity.



Activity : In Δ PQR, If $\angle QPR = 90^0$, PM $\perp$QR, ...,.. (given)

In Δ PMQ, By Pythagoras Theorem,

$\therefore PM^2 +$ ☐ $= PQ^2 \ldots\ldots$ (I)

$\therefore PQ^2 = 10^2 + 8^2$

$\therefore PQ^2 =$ ☐ $+ 64$

$\therefore PQ^2 =$ ☐

$\therefore PQ = \sqrt{164}$

Here, $\Delta QPR \sim \Delta QMP \sim \Delta PMR$

$\therefore \Delta QMP \sim \Delta PMR$

$\therefore \frac{PM}{RM} = \frac{QM}{PM}$

$\therefore PM^2 = RM \times QM$

$\therefore 10^2 = RM \times 8$

$RM = \frac{100}{8} =$ ☐

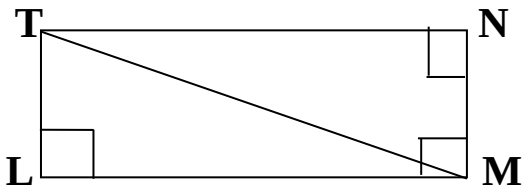
And,

$QR = QM + MR$

$QR =$ ☐ $+ \frac{25}{2} = \frac{41}{2}$

9. Find the diagonal of a rectangle whose length is 16 cmand area is 192sq.cm. Complete the following activity.

Activity :



As shown in fig. ▢ LMNT is rectangle

$\therefore$ Area of rectangle = length X breadth

$\therefore$ Area of rectangle = ☐ X breadth

$\therefore 192 =$ ☐ X breadth

$\therefore$ Breadth = 12 cm.

Also, $\angle TLM = 90^0$ ..... (each angle of rectangle is right angle)

In ΔTLM, By Pythagoras theorem

$\therefore TM^2 = TL^2 +$ ☐

$\therefore TM^2 = 12^2 +$ ☐

$\therefore TM^2 = 144 +$ ☐

$\therefore TM^2 = 400$

$\therefore TM = 20$

10. In Δ LMN, l = 5, m = 13, n = 12 then complete the activity to show that wheather given traingle is right angled traingle or not.

* (l , m, n are opposite sides of $\angle$L, $\angle$M, $\angle$N respectively)

Activity :

In ΔLMN **मध्ये**, l = 5, m = 13, n = ☐

$\therefore l^2 =$ ☐ ; $m^2 = 169$; $n^2 = 144$.

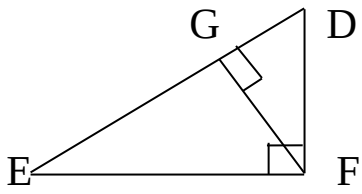
$\therefore l^2 + n^2 = 25 + 144 =$ ☐

$\therefore$ ☐ $+ l^2 = m^2$

$\therefore$By Converse of Pythagoras theorem, ΔLMN is right angled triangle.

Que. 3 (B). Solve the following questions : (3 marks each)

1. As shwon in figure, $\angle$ DFE = 90^0, FG$\perp$ED, If GD = 8, FG = 12, then (1) EG = ? (2) FD = ? (3) EF = ?



2. A congruent side of an isosceles right angled triangle is 7 cm ,Find its perimetre .

Que. 4. Solve the following questions : (Challenging question 4 marks each)

1. As shwon in figure, LK = $6\sqrt{2}$ then 1) MK = ? 2) ML = ? 3) MN = ?