## Triangles Ex 4.7 Q20

**Answer :**

(i) Since AD perpendicular to BC we obtained two right angled triangles, triangle ADB and triangle ADC.

We will use Pythagoras theorem in the right angled triangle ADC

$AC^2 = AD^2 + DC^2$ .........(1)

Let us substitute AD = *h*, AC = *b* and DC = (*a* − *x*) in equation (1) we get,

$b^2 = h^2 + (a - x)^2$

$b^2 = h^2 + a^2 - 2ax + x^2$

$b^2 = h^2 + a^2 + x^2 - 2ax$ .........(2)

(ii) Let us use Pythagoras theorem in the right angled triangle ADB as shown below,

$AB^2 = AD^2 + BD^2$ .........(3)

Let us substitute AB = *c*, AD = *h* and BD = *x* in equation (3) we get,

$c^2 = h^2 + x^2$

Let us rewrite the equation (2) as below,

$b^2 = h^2 + x^2 + a^2 - 2ax$ .........(4)

Now we will substitute $h^2 + x^2 = c^2$ in equation (4) we get,

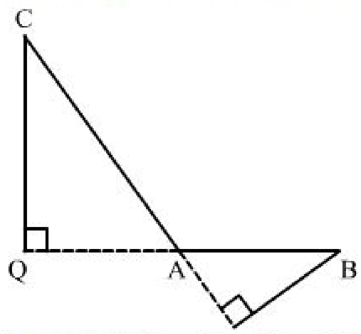
$b^2 = c^2 + a^2 - 2ax$

Therefore, $b^2 = c^2 + a^2 - 2ax$.

## Triangles Ex 4.7 Q21

**Answer :**

Given: ΔABC where ∠BAC is obtuse. PB ⊥AC and QC⊥AB.




To prove: (i) AB × AQ = AC × AP and (ii) $BC^2$ = AC × CP + AB × BQ

Proof: In ΔACQ and ΔABP,

∠CAQ = ∠BAP (Vertically opposite angles)

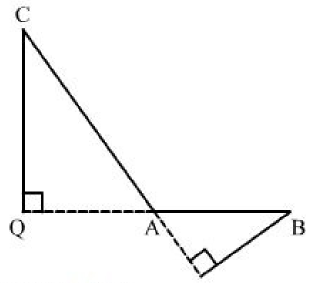
∠Q = ∠P (= 90°)

∴ ΔACQ ~ ΔABP [AA similarity test]

$$\Rightarrow \frac{CQ}{BP} = \frac{AC}{AB} = \frac{AQ}{AP} \quad [\text{Corresponding sides are in the same proportion}]$$

$$\frac{AC}{AB} = \frac{AQ}{AP}$$

$$\Rightarrow AQ \times AB = AC \times AP \qquad (1)$$




In right $\Delta BCQ$,

$\Rightarrow BC^2 = CQ^2 + QB^2$

$\Rightarrow BC^2 = CQ^2 + (QA + AB)^2$

$\Rightarrow BC^2 = CQ^2 + QA^2 + AB^2 + 2QA \times AB$

$\Rightarrow BC^2 = AC^2 + AB^2 + QA \times AB + QA \times AB$ [In right $\Delta ACQ$, $CQ^2 + QA^2 = AC^2$]

$\Rightarrow BC^2 = AC^2 + AB^2 + QA \times AB + AC \times AP$ (Using (1))

$\Rightarrow BC^2 = AC\ (AC + AP) + AB\ (AB + QA)$

$\Rightarrow BC^2 = AC \times CP + AB \times BQ$

*********** END **********