

Isosceles Triangles



An isosceles triangle is a triangle in which two sides are equal in length.

The angles opposite the two equal sides are called the **base angles**.
The vertex where the two equal sides meet is called the **apex**.



PROPERTIES

The following properties are associated with the isosceles triangle theorem:

- Property 1: If a triangle has two equal angles then it is isosceles.
- Property 2: The angle bisector of the apex of an isosceles triangle bisects the base at right angles.
- Property 3: The perpendicular bisector of the base of an isosceles triangle passes through its apex.

THE ISOSCELES TRIANGLE THEOREM

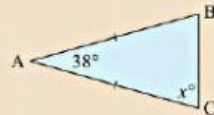
In an isosceles triangle:

- base angles are equal
- the line joining the apex to the midpoint of the base bisects the vertical angle and meets the base at right angles.

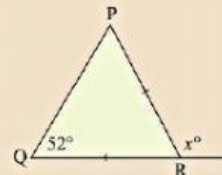
Example

Find x , giving brief reasons:

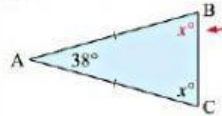
a



b



a



As $AB = AC$, the triangle is isosceles

$\therefore \hat{ABC} = x^\circ$ also

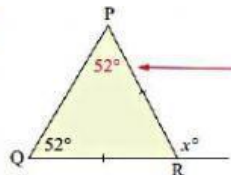
Now $x + x + 38 = 180$ {angles of a Δ }

$$\therefore 2x = 180 - 38$$

$$\therefore 2x = 142$$

$$\therefore x = 71$$

b



As $PR = QR$, the triangle is isosceles

$\therefore \hat{QPR} = 52^\circ$ {isosceles Δ theorem}

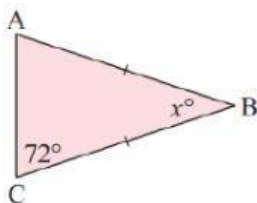
$\therefore x = 52 + 52$ {exterior angle theorem}

$$\therefore x = 104$$

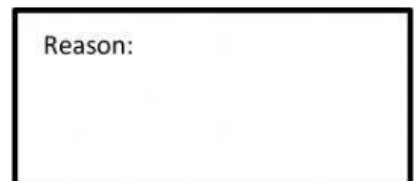
Exercise:

1) Find x , give a brief reasons:

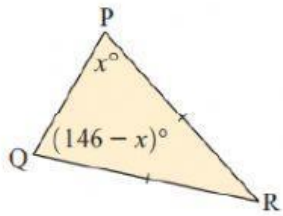
a



Reason:

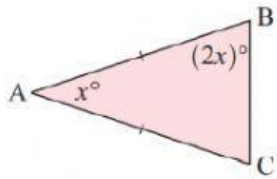


b



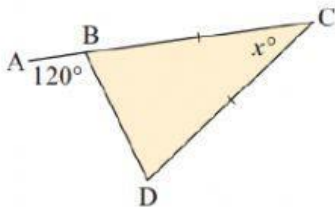
Reason:

c



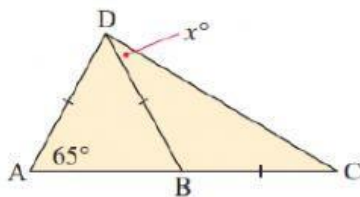
Reason:

d



Reason:

e



Reason: