A Property of Right Angled Triangles with a 30 °Angle

Theorem 1 *In any right angled triangle with an angle of 30°, the side opposite to the 30° angle is half the length of the hypotenuse.*

Proof

Consider triangle ABC (Figure 1). Given that $\angle ABC = 30°$ and $\angle ACB = 90°$, we need to prove that $AC = \frac{1}{2}AB$

Draw a line through M such that it intersects AB at some point M and makes an angle $ACM = 60°$. $\triangle AMC$ is equilateral $\Rightarrow AC = AM = MC$
$\angle MCB = \angle ACB - \angle ACM = 90° - 60° = 30°$
This means that: $\triangle CMB$ is isosceles. $\Rightarrow MB = MC \Rightarrow MB = AC$

$AB = AM + MB = AC + AC = 2AC$
$AC = \frac{1}{2}AB$

$\therefore$ QED

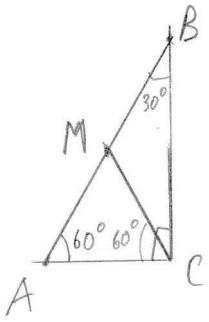

Figure 1