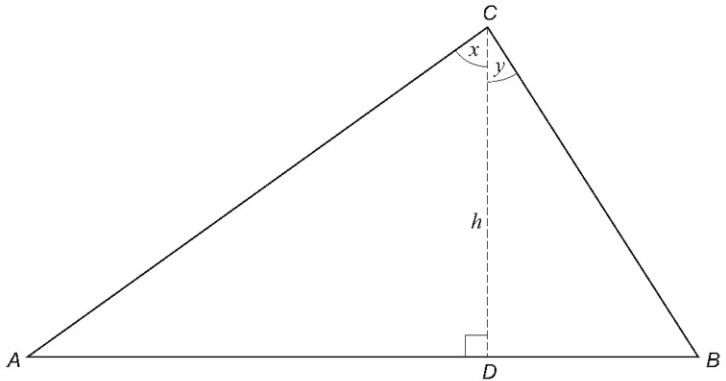
10 The triangle *ABC* is shown in the diagram.



The point *D* on *AB* is such that *CD* is perpendicular to *AB*

The distance *CD* is h

Angle *DCA* = x and angle *BCD* = y

10 (a) Write down an expression, in terms of h and x, for the distance *AC*

[1 mark]

10 (b) (i) Show that the area of triangle *ADC* is given by

$$\frac{h^2 \sec x \sin x}{2}$$

[1 mark]

10 (b) (ii) Write down an expression, in terms of h and y, for the area of triangle *BCD*

[1 mark]

10 (c) The area of triangle *ABC* can be written as

$$\frac{h^2 \sec x \sec y \sin(x + y)}{2}$$

Prove using this expression for the area of triangle *ABC* and the results from part **(b)(i)** and part **(b)(ii)**, that

$$\sin(x + y) = \sin x \cos y + \cos x \sin y$$

[3 marks]