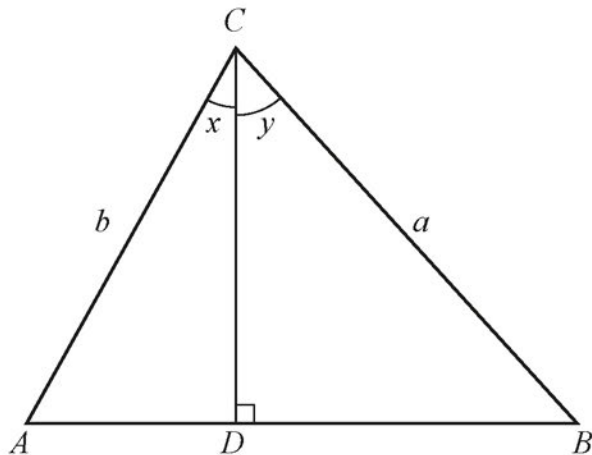


10 (a)



The diagram shows triangle ABC . The perpendicular from C to AB meets AB at D .

Angle $ACD = x$, angle $DCB = y$, length $BC = a$ and length $AC = b$.

- (i) Explain why the length of CD can be written as $a \cos y$. [1]
- (ii) Show that the area of the triangle ADC is given by $\frac{1}{2}ab \sin x \cos y$. [1]
- (iii) Hence, or otherwise, show that $\sin(x+y) = \sin x \cos y + \cos x \sin y$. [4]
- (b) Given that $\sin(30^\circ + \alpha) = \cos(45^\circ - \alpha)$, show that $\tan \alpha = 2 + \sqrt{6} - \sqrt{3} - \sqrt{2}$. [5]