

- 5 (i) Sketch the graphs of  $y = 4 \cos x$  and  $y = 2 \sin x$  for  $0^\circ \leq x \leq 180^\circ$  on the same axes. [2]
- (ii) Find the exact coordinates of the point of intersection of these graphs, giving your answer in the form  $(\arctan a, k\sqrt{b})$ , where  $a$  and  $b$  are integers and  $k$  is rational. [4]
- (iii) A student argues that without the condition  $0^\circ \leq x \leq 180^\circ$  all the points of intersection of the graphs would occur at intervals of  $360^\circ$  because both  $\sin x$  and  $\cos x$  are periodic functions with this period. Comment on the validity of the student's argument. [1]