

**11** The function  $f : x \mapsto 4 - 3 \sin x$  is defined for the domain  $0 \leq x \leq 2\pi$ .

(i) Solve the equation  $f(x) = 2$ . [3]

(ii) Sketch the graph of  $y = f(x)$ . [2]

(iii) Find the set of values of  $k$  for which the equation  $f(x) = k$  has no solution. [2]

The function  $g : x \mapsto 4 - 3 \sin x$  is defined for the domain  $\frac{1}{2}\pi \leq x \leq A$ .

(iv) State the largest value of  $A$  for which  $g$  has an inverse. [1]

(v) For this value of  $A$ , find the value of  $g^{-1}(3)$ . [2]