

**11** The function  $f : x \mapsto 6 - 4 \cos\left(\frac{1}{2}x\right)$  is defined for  $0 \leq x \leq 2\pi$ .

(i) Find the exact value of  $x$  for which  $f(x) = 4$ . [3]

(ii) State the range of  $f$ . [2]

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

(iv) Find an expression for  $f^{-1} x$  . [3]