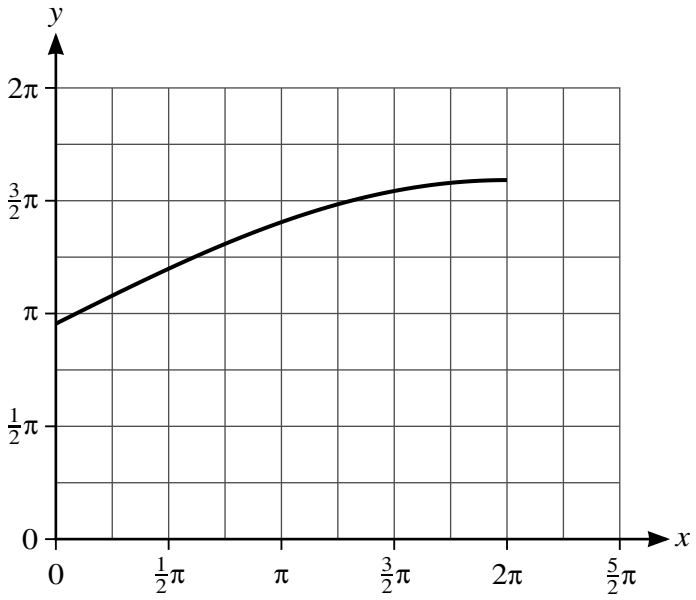
**8**




The diagram shows the graph of $y = f(x)$ where the function f is defined by

$$f(x) = 3 + 2\sin\tfrac{1}{4}x \text{ for } 0 \leqslant x \leqslant 2\pi.$$

**(a)** On the diagram above, sketch the graph of $y = f^{-1}(x)$. [2]

**(b)** Find an expression for $f^{-1}(x)$. [2]

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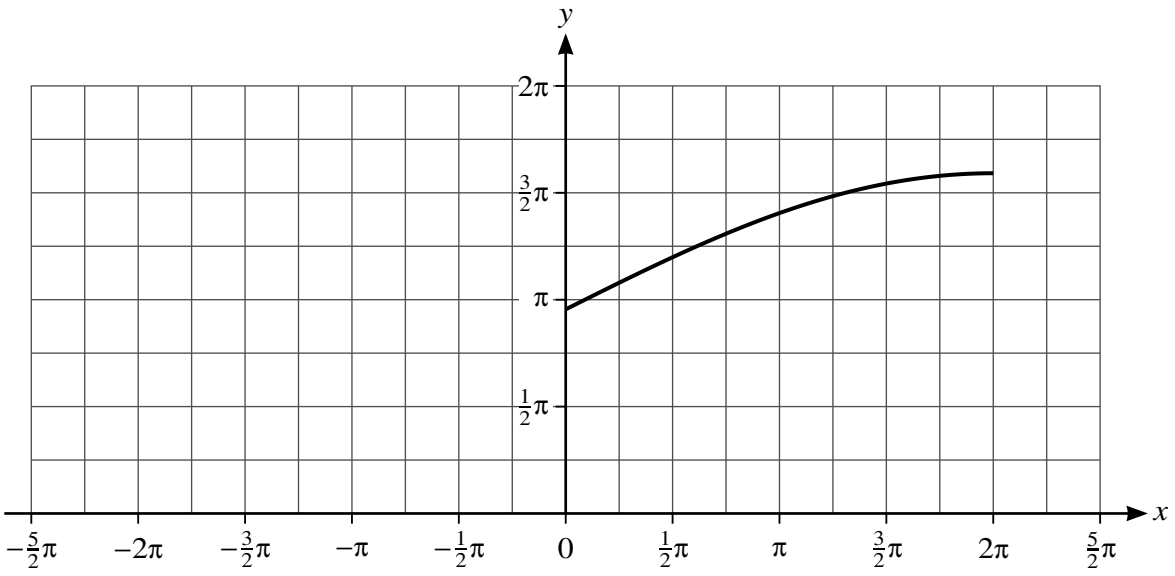
**(c)**




The diagram above shows part of the graph of the function $g(x) = 3 + 2\sin\frac{1}{4}x$ for $-2\pi \leqslant x \leqslant 2\pi$.

Complete the sketch of the graph of $g(x)$ on the diagram above and hence explain whether the function g has an inverse. [2]

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**(d)** Describe fully a sequence of three transformations which can be combined to transform the graph of $y = \sin x$ for $0 \leqslant x \leqslant \frac{1}{2}\pi$ to the graph of $y = f(x)$, making clear the order in which the transformations are applied. [6]

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