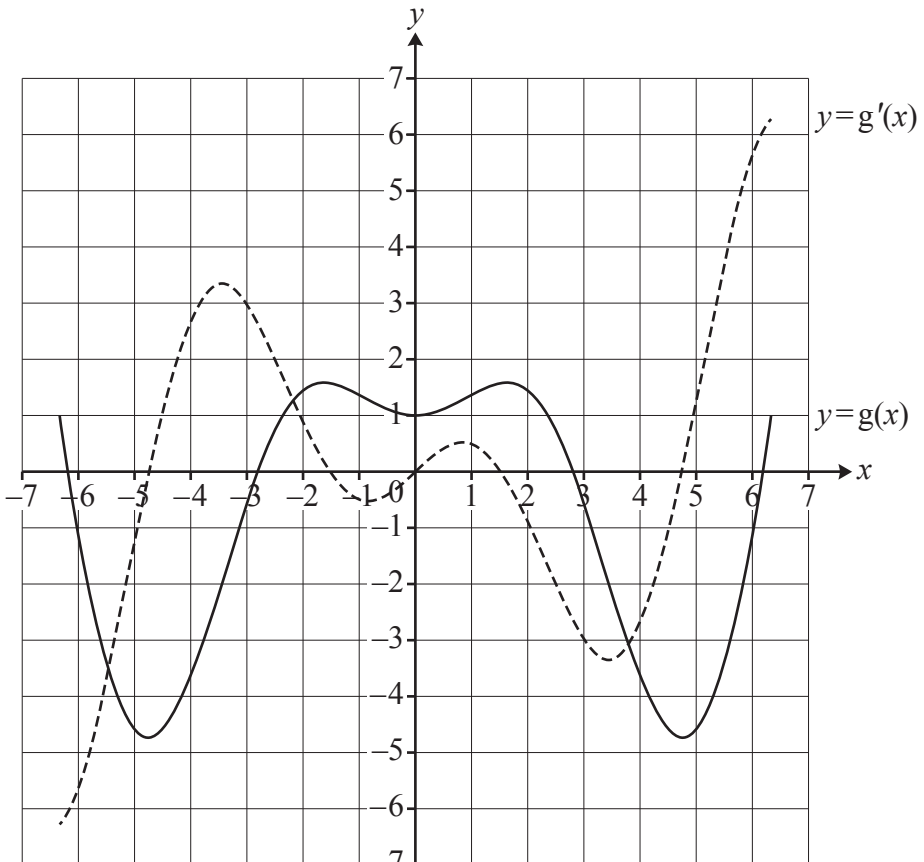
11 **Fig. 11.1** shows the curve with equation $y = g(x)$ where $g(x) = x\sin x + \cos x$ and the curve of the gradient function $y = g'(x)$ for $-2\pi \leqslant x \leqslant 2\pi$.

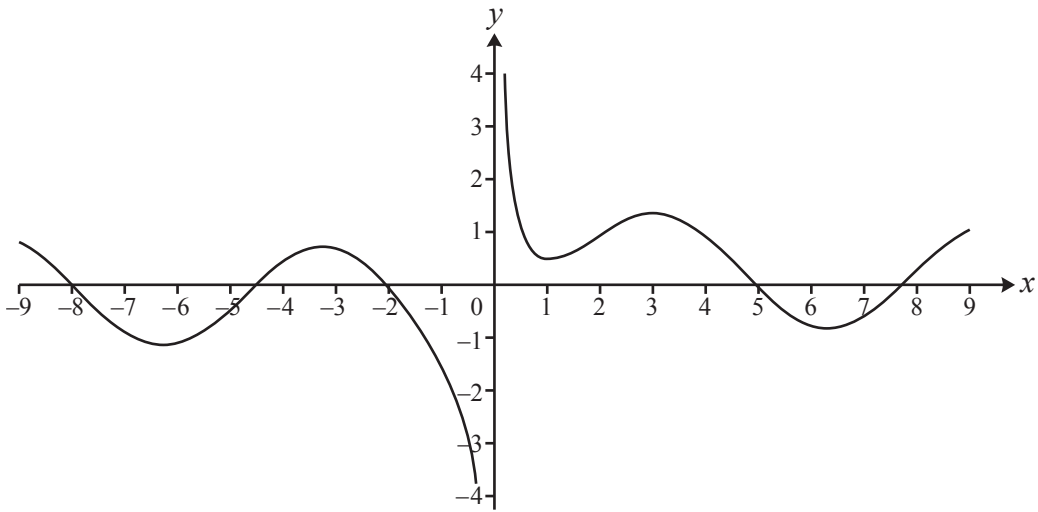
Fig. 11.1



(a) Show that the x-coordinates of the points on the curve $y = g(x)$ where the gradient is 1 satisfy the equation $\frac{1}{x} - \cos x = 0$. **[3]**

Fig. 11.2 shows part of the curve with equation $y = \frac{1}{x} - \cos x$.

Fig. 11.2



(b) Use the Newton-Raphson method with a suitable starting value to find the smallest positive x-coordinate of a point on the curve $y = x\sin x + \cos x$ where the gradient is 1.

You should write down at least the following.

- The iteration you use
- The starting value
- The solution correct to **4** decimal places **[4]**

(c) Explain why $x_1 = 3$ is **not** a suitable starting value for the Newton-Raphson method in part **(b)**. **[1]**