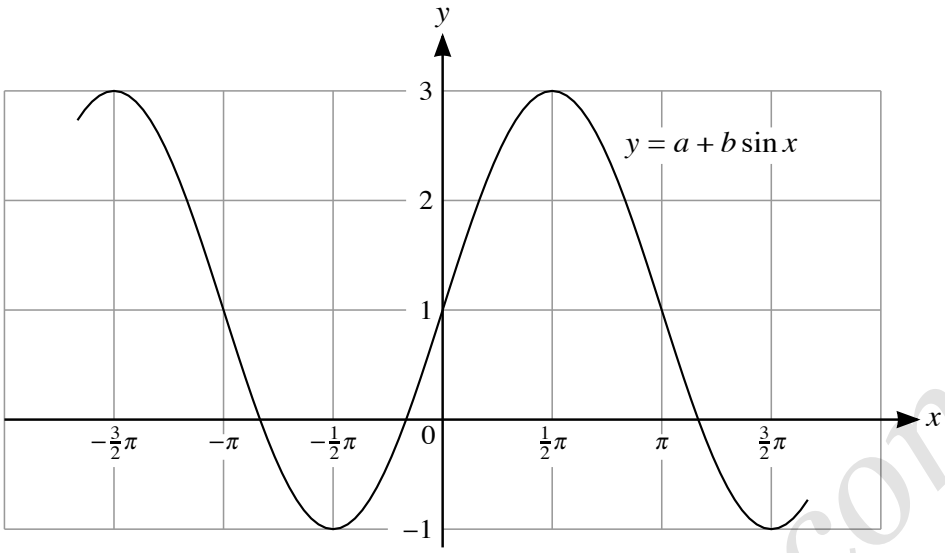
1



The diagram shows part of the graph of $y = a + b\sin x$. State the values of the constants a and b. [2]

$y = b\sin x + a$ Max = 3 Min = −1

$$b = \frac{\text{Max} - \text{Min}}{2} = \frac{3 - -1}{2} = 2 \quad //$$

$$a = \frac{\text{Max} + \text{min}}{2} = \frac{3 + -1}{2} = 1 \quad //$$

2 **(i)** Express $4x^2 - 12x$ in the form $(2x + a)^2 + b$. [2]

(ii) Hence, or otherwise, find the set of values of x satisfying $4x^2 - 12x > 7$. [2]

(i) $y = 4x^2 - 12x \rightarrow \frac{y}{4} = x^2 - 3x \rightarrow \frac{y}{4} = x^2 - 3x + \frac{9}{4} - \frac{9}{4}$

($b = -3$, $\left(\frac{b}{2}\right)^2 = \frac{9}{4}$)

$\rightarrow \frac{y}{4} = \left(x - \frac{3}{2}\right)^2 - \frac{9}{4} \rightarrow y = 4\left(x - \frac{3}{2}\right)^2 - 9 \rightarrow \boxed{y = (2x - 3)^2 - 9}$

(2^2)

(ii) $4x^2 - 12x > 7 \rightarrow (2x - 3)^2 - 9 > 7 \rightarrow (2x - 3)^2 > 16$

$\rightarrow \begin{cases} 2x - 3 > 4 \rightarrow x > 7/2 \\ \text{OR} \\ 2x - 3 < -4 \rightarrow x < -1/2 \end{cases}$ ✗