

5. (a) Sketch the graph with equation

$$y = |4x - 3|$$

stating the coordinates of any points where the graph cuts or meets the axes.

(2)

Find the complete set of values of x for which

(b)

$$|4x - 3| > 2 - 2x$$

(4)

(c)

$$|4x - 3| > \frac{3}{2} - 2x$$

(2)



Question 5 continued



7.

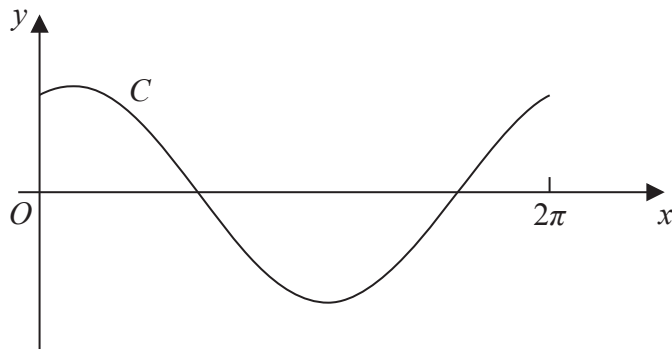


Figure 1

Figure 1 shows the curve C , with equation $y = 6 \cos x + 2.5 \sin x$ for $0 \leq x \leq 2\pi$

- (a) Express $6 \cos x + 2.5 \sin x$ in the form $R \cos(x - \alpha)$, where R and α are constants with $R > 0$ and $0 < \alpha < \frac{\pi}{2}$. Give your value of α to 3 decimal places. (3)
- (b) Find the coordinates of the points on the graph where the curve C crosses the coordinate axes. (3)

A student records the number of hours of daylight each Sunday throughout the year. She starts on the last Sunday in May with a recording of 18 hours, and continues until her final recording 52 weeks later.

She models her results with the continuous function given by

$$H = 12 + 6 \cos\left(\frac{2\pi t}{52}\right) + 2.5 \sin\left(\frac{2\pi t}{52}\right), \quad 0 \leq t \leq 52$$

where H is the number of hours of daylight and t is the number of weeks since her first recording.

Use this function to find

- (c) the maximum and minimum values of H predicted by the model, (3)
- (d) the values for t when $H = 16$, giving your answers to the nearest whole number.

[You must show your working. Answers based entirely on graphical or numerical methods are not acceptable.] (6)



