2. **In this question you must show all stages of your working.**
Solutions relying entirely on calculator technology are not acceptable.

A vessel that contained some water started to leak from a hole in its base.

The volume of water in the vessel 25 minutes after the leak started was $6\,m^3$

The volume of water in the vessel 64 minutes after the leak started was $3.3\,m^3$

The volume of water, $V\,m^3$, in the vessel t minutes after the leak started, is modelled by the equation

$$V = a\sqrt{t} + b$$

where a and b are constants.

(a) Find the value of a and the value of b.

(4)

(b) Using the equation of the model,

(i) find the initial volume of water in the vessel,

(ii) find the time taken, after the leak started, for the vessel to empty.
Give your answer to the nearest minute.

(3)

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Question 2 continued

(Total for Question 2 is 7 marks)

3.

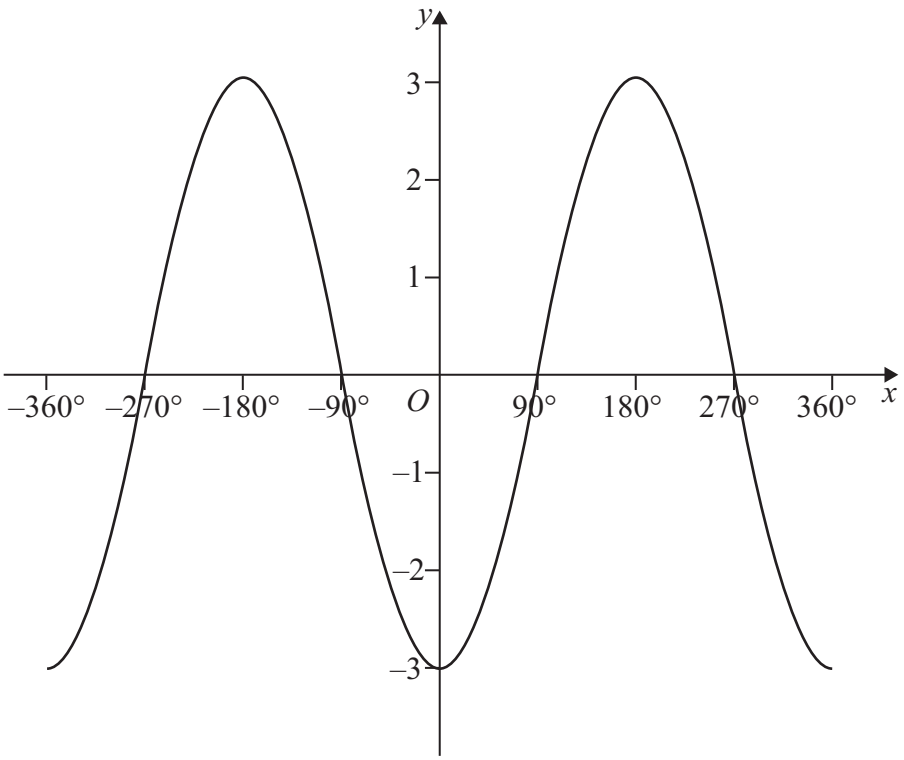

Figure 2

Figure 2 shows part of the graph of the trigonometric function with equation $y = f(x)$, where x is measured in degrees.

(a) Write down an expression for $f(x)$.

(2)

(b) State the number of solutions of the equation

(i) $f(x) = 2$ in the interval $-720° \leqslant x \leqslant 720°$

(ii) $f(x) = -3$ in the interval $-720° \leqslant x \leqslant 720°$

(2)

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