4.

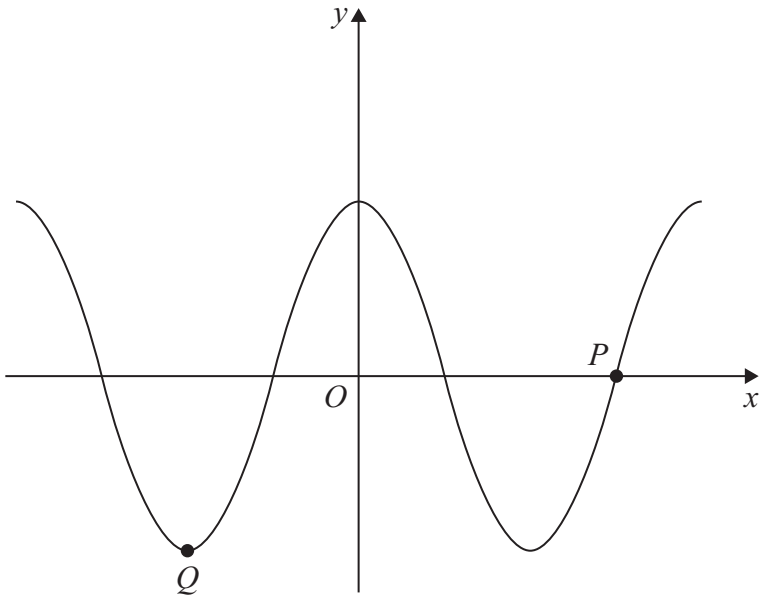

Figure 1

Figure 1 shows a sketch of part of the curve with equation

$$y = 4\cos x$$

where x is measured in degrees.

The points P and Q lie on the curve and are shown in Figure 1.

(a) State the coordinates of P.

(1)

(b) State the coordinates of Q.

(2)

(c) State the **number** of solutions of the equation

(i) $4\cos x = 3$ in the interval $0 < x \leqslant 18\,000°$

(ii) $5 + 4\cos x = 1$ in the interval $-720° < x \leqslant 720°$

(iii) $4\cos x - 3 = 1$ in the interval $-1080° \leqslant x \leqslant 1080°$

(3)

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Question 4 continued

(Total for Question 4 is 6 marks)

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

The line l_1 has equation

$$x - 2y + 25 = 0$$

The line l_2 passes through the origin and is perpendicular to l_1

(a) Find an equation for l_2

(2)

The lines l_1 and l_2 intersect at the point P.

(b) Use algebra to find the coordinates of P.

(3)

(c) Hence find the shortest distance from l_1 to the origin.

Write your answer as a fully simplified surd.

(2)

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