Exercise 3

Paper 2 style · Graphic display calculator

3 6 marks SL 5.8 ●●○ Typical

Let $f(x) = 2x + 5\cos x$, for $0 \leq x \leq 2\pi$, where x is in radians.

(a) Find the coordinates of the local maximum point and of the local minimum point of the graph of f. **[4]**

(b) Find the greatest value of $f(x)$ for $0 \leq x \leq 2\pi$. **[2]**

The markscheme is on the next page: try the question first. Written and verified by a practising IB mathematics teacher, produced with AI assistance; solved twice and recomputed by software. Not affiliated with or endorsed by the International Baccalaureate Organization.
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MARKSCHEME (a)

use of GDC, or $f'(x) = 2 - 5\sin x = 0$ **(M1)**

maximum $(0.412,\ 5.41)$ $(0.411516\ldots, 5.40560\ldots)$ **A1**

minimum $(2.73,\ 0.878)$ $(2.73007\ldots, 0.877575\ldots)$ **A1**

both labelled correctly **A1**

Total 4 marks

MARKSCHEME (b)

compare with the ends: $f(0) = 5,\ f(2\pi) = 4\pi + 5 = 17.6$ **M1**

17.6 $(17.5663\ldots)$ **A1**

Total 2 marks

Note The greatest value is at an end of the interval, not at the local maximum: 5.41 earns M0A0.