Exercise 3

Paper 1 style · No calculator

3 7 marks SL 3.8 ●●● Demanding

Consider the equation $2\sin^2 x + \cos x - 1 = 0$, for $0 \leq x \leq 2\pi$.

(a) Show that the equation can be written as $2\cos^2 x - \cos x - 1 = 0$. **[2]**

(b) Hence solve the equation. **[5]**

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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(b) Hence solve the equation. **[5]**

MARKSCHEME (a)

$2(1 - \cos^2 x) + \cos x - 1 = 0$ **M1**

$-2\cos^2 x + \cos x + 1 = 0$ **A1**

$2\cos^2 x - \cos x - 1 = 0$ **AG**

Total 2 marks

MARKSCHEME (b)

$(2\cos x + 1)(\cos x - 1) = 0$ **M1**

$\cos x = -\frac{1}{2}$ **A1**

$\cos x = 1$ **A1**

$x = \frac{2\pi}{3}, \frac{4\pi}{3}$ **A1**

$x = 0,\ 2\pi$ **A1**

Total 5 marks

Note Both ends of the interval are included.