Exercise 3

Paper 1 style · No calculator

3 7 marks SL 3.6 ●●○ Typical

It is given that $\sin\theta = \frac{1}{3}$, where $\frac{\pi}{2} < \theta < \pi$.

(a) Find the exact value of $\cos\theta$. **[3]**

(b) Find the exact value of $\sin 2\theta$. **[2]**

(c) Find the exact value of $\cos 2\theta$. **[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)

$\cos^2\theta = 1 - \frac{1}{9} = \frac{8}{9}$ M1

$\cos\theta < 0$ because $\frac{\pi}{2} < \theta < \pi$ R1

$\cos\theta = -\frac{2\sqrt{2}}{3}$ A1

Total 3 marks

MARKSCHEME (b)

$2 \times \frac{1}{3} \times \left(-\frac{2\sqrt{2}}{3}\right)$ M1

$-\frac{4\sqrt{2}}{9}$ A1

Total 2 marks

MARKSCHEME (c)

$1 - 2\left(\frac{1}{3}\right)^2$ M1

$\frac{7}{9}$ A1

Total 2 marks