Exercise 1

Paper 1 style · No calculator

1 **7 marks** AHL 3.9 ●●○ Typical

Find the exact value of

(a) $\arccos\left(-\frac{1}{2}\right)$; [1]

(b) $\arctan\left(-\sqrt{3}\right)$; [1]

(c) $\arccos\left(\cos\frac{5\pi}{3}\right)$; [2]

(d) $\sin\left(\arccos\frac{2}{5}\right)$. [3]

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)

$\frac{2\pi}{3}$ A1

Total 1 mark

Note In $[0, \pi]$.

MARKSCHEME (b)

$-\frac{\pi}{3}$ A1

Total 1 mark

Note In $\left]-\frac{\pi}{2}, \frac{\pi}{2}\right[$.

MARKSCHEME (c)

$\cos\frac{5\pi}{3} = \cos\frac{\pi}{3}$ M1

$\frac{\pi}{3}$ A1

Total 2 marks

Note $2\pi - \frac{5\pi}{3}$, which is in $[0, \pi]$.

MARKSCHEME (d)

$\alpha = \arccos\frac{2}{5}$, $\sin^2\alpha = 1 - \frac{4}{25} = \frac{21}{25}$ M1

$\sin\alpha \geq 0$ since $0 \leq \alpha \leq \pi$ R1

$\sin\alpha = \frac{\sqrt{21}}{5}$ A1

Total 3 marks