Exercise 2

Paper 1 style · No calculator

2 7 marks AHL 3.9 ●●○ Typical

It is given that $\tan\theta = -\frac{\sqrt{7}}{3}$, where $\frac{\pi}{2} < \theta < \pi$.

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

(b) Find the exact value of $\operatorname{cosec}\theta$. **[2]**

(c) Hence find the exact value of $\sin 2\theta$. **[2]**

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(b) Find the exact value of $\operatorname{cosec}\theta$. [2]

(c) Hence find the exact value of $\sin 2\theta$. [2]

MARKSCHEME (a)

$\sec^2\theta = 1 + \frac{7}{9} = \frac{16}{9}$ M1

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

$\sec\theta = -\frac{4}{3}$ A1

Total 3 marks

MARKSCHEME (b)

$\operatorname{cosec}^2\theta = 1 + \cot^2\theta = 1 + \frac{9}{7} = \frac{16}{7}$ M1

$\operatorname{cosec}\theta = \frac{4}{\sqrt{7}} = \frac{4\sqrt{7}}{7}$ A1

Total 2 marks

Note Or $\sin\theta = \tan\theta\cos\theta = \frac{\sqrt{7}}{4}$.

Note Positive: $\sin\theta > 0$ in the second quadrant.

MARKSCHEME (c)

$\sin\theta = \frac{\sqrt{7}}{4}$, $\cos\theta = -\frac{3}{4}$, $2 \times \frac{\sqrt{7}}{4} \times \left(-\frac{3}{4}\right)$ M1

$\sin 2\theta = -\frac{3\sqrt{7}}{8}$ A1

Total 2 marks