(a) Show that $\sin 2\theta \cot \theta - \cos 2\theta \equiv 1$. [3]

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(b) Hence find the exact value of $\sin \frac{1}{6}\pi \cot \frac{1}{12}\pi$. [2]

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(c) Find the smallest positive value of θ (in radians) satisfying the equation

$$\sin 2\theta \cot \theta - 3 \cos 2\theta = 1.$$ [2]

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