5 **(a)** The function f is defined by $\mathrm{f}(x) = \dfrac{1+2\sin^2 x}{\cos^2 x}$ for $-\dfrac{\pi}{2} < x < \dfrac{\pi}{2}$.

(i) Show that $\mathrm{f}(x)$ can be written as $a\tan^2 x + b$, where a and b are integers. [2]

(ii) Hence solve the equation $\mathrm{f}(x) = 4$. [3]

(iii) Hence also find the gradient of the curve $y = \mathrm{f}(x)$ at each of the points where $y = 4$. [4]

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(b) Solve the equation $50\cos^2\theta = 5\sin\theta + 47$ for $0° \leqslant \theta \leqslant 360°$. [5]