3 **(a)** Write $\dfrac{x(27xy^3)^{\frac{5}{3}}}{\sqrt[4]{81y^5}}$ in the form $3^a \times x^b \times y^c$ where a, b and c are constants. [3]

(b) **(i)** Find the value of a such that $2\log_a 8 = \dfrac{3}{2}$. [2]

(ii) Write $\log_{(a^2)} 3a$ as a single logarithm to base a. [2]

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4 Variables x and y are such that $y = \frac{\sin x}{\cos x}$. Using differentiation, find the approximate change in y as x increases from $-\frac{\pi}{4}$ to $h - \frac{\pi}{4}$, where h is small. [4]

5 **(a)** Solve the inequality $2x^2 - 17x + 21 \leqslant 0$. [3]

(b) Hence find the area enclosed between the curve $y = 2x^2 - 17x + 21$ and the x-axis. [3]

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