1 DO NOT USE A CALCULATOR IN THIS QUESTION.

Write $\dfrac{4-\sqrt{5}}{7-3\sqrt{5}}$ with a rational denominator, simplifying your answer. [3]

2 Given that $y = 2(7^{2x}) - 3(7^{x+1}) + 19$, find the value of x when $y = 30$. [4]

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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