3 **(a)** Solve the following simultaneous equations.

$$3\log_2 x + 2\log_2 y = 24$$

$$5\log_2 x - 3\log_2 y = 2$$ [5]

(b) Solve the equation $\dfrac{2^{t+4}}{2^{1-2t}} = 512$. [4]

4 Find the exact value of $\int_3^5 \frac{(x-1)^2}{x^3}\,\mathrm{d}x$. [6]

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