3 **(a)** Find the exact solution of the equation $2e^{6x} - 3e^{3x} - 5 = 0$. [3]

(b) Solve the following simultaneous equations.

$$e^{4x-7} \div e^{5x+7y} = \frac{1}{e^2}$$

$$xy + 18 = 0$$ [5]

4 Variables x and y are such that when e^{4y} is plotted against x, a straight line of gradient $\frac{2}{5}$, passing through (10, 2), is obtained.

(a) Find y in terms of x. [3]

(b) Find the value of y when $x = 45$, giving your answer in the form $\ln p$. [2]

(c) Find the values of x for which y can be defined. [1]

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