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9 It is given that $\mathrm{f}(x) = \ln(2x+5)$ for $x > a$, where a is a constant.

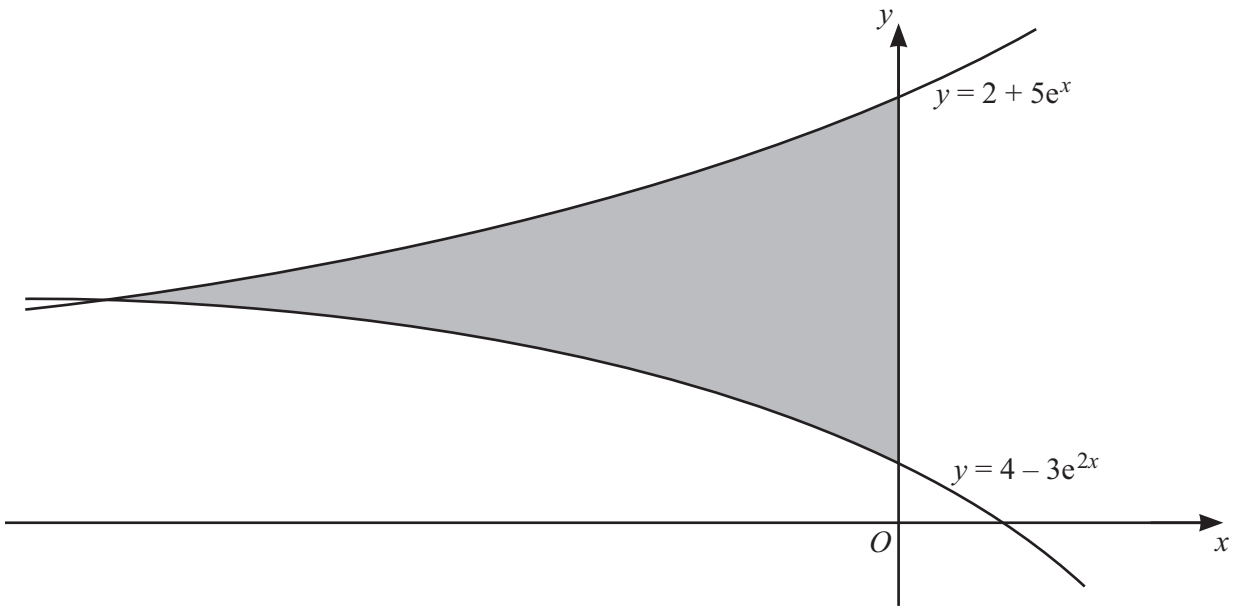
(a) Write down the least possible value of a. [1]

(b) Using your value of a, write down the range of f. [1]

It is also given that $\mathrm{g}(x) = x^2 + 1$ for $x \in \mathbb{R}$.

(c) Using your value of a, solve the equation $\mathrm{fg}(x) = 4$.
Give your answers in exact form. [3]

10



The diagram shows parts of the graphs of $y = 2 + 5e^x$ and $y = 4 - 3e^{2x}$.

Find the area of the shaded region.
Give your answer in the form $a + b \ln 3$, where a and b are exact constants. [10]

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