8 A function $f(x)$ is such that $f(x) = \ln(2x+3) + \ln 4$, for $x > a$, where a is a constant.

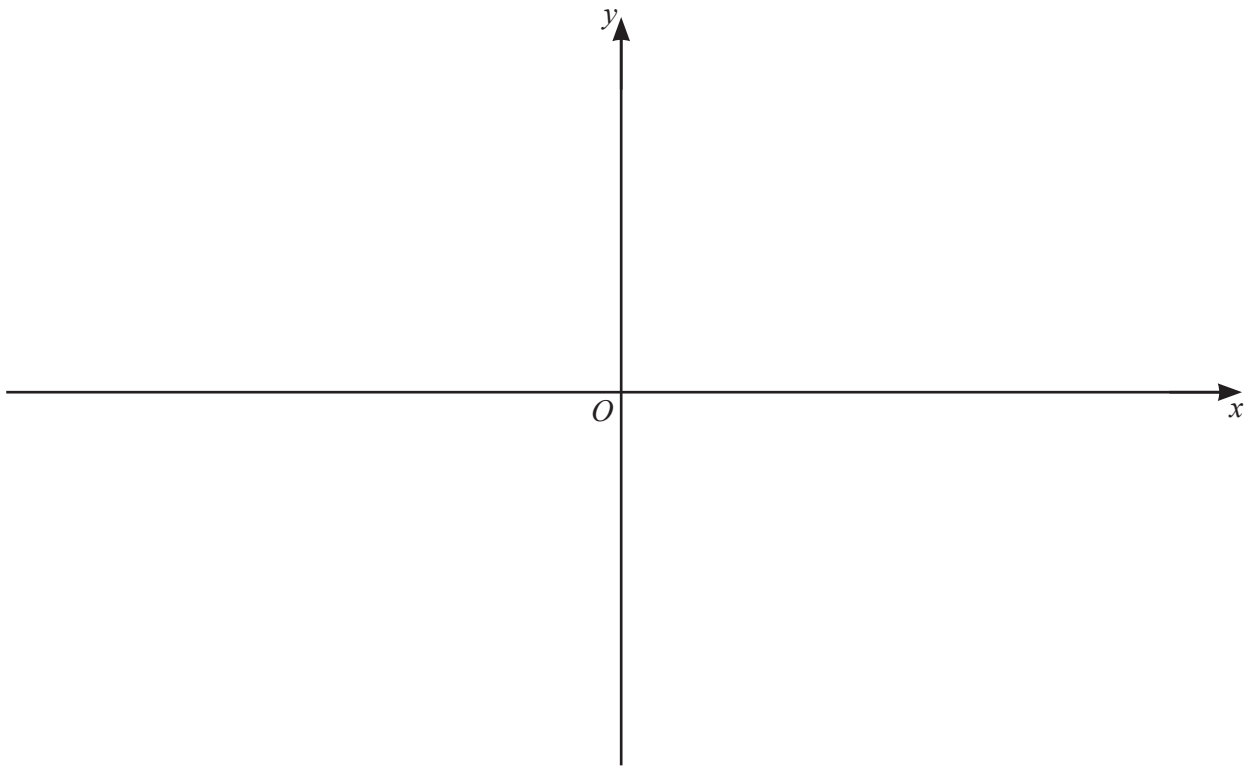
(a) Write down the least possible value of a. [1]

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

(c) Using your value of a, find $f^{-1}(x)$, stating its range. [4]

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(d) On the axes below, sketch the graphs of $y = \mathrm{f}(x)$ and $y = \mathrm{f}^{-1}(x)$, stating the exact intercepts of each graph with the coordinate axes. Label each of your graphs. [4]



9 **(a)** Show that $\frac{1}{2x+1}-\frac{1}{(2x+1)^2}+\frac{4}{4x-1}=\frac{24x^2+14x+4}{(2x+1)^2(4x-1)}$. [2]

(b) Hence find $\int_{\frac{1}{2}}^{1}\frac{24x^2+14x+4}{(2x+1)^2(4x-1)}\mathrm{d}x$, giving your answer in the form $\frac{1}{2}\ln p+q$, where p and q are rational numbers. [7]

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