8 It is given that $y = \dfrac{\ln(3x^2 + 16)}{x + 2}$.

(a) Find $\dfrac{\mathrm{d}y}{\mathrm{d}x}$ when $x = 0$.

Give your answer in the form $\ln p$, where p is a constant. [5]

(b) Given that x increases from 0 to h, where h is small, write down the approximate change in y. [1]

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9 It is given that $\mathrm{f}(x) = 2\ln(3x-4)$, for $x > a$, and that f^{-1} exists.

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

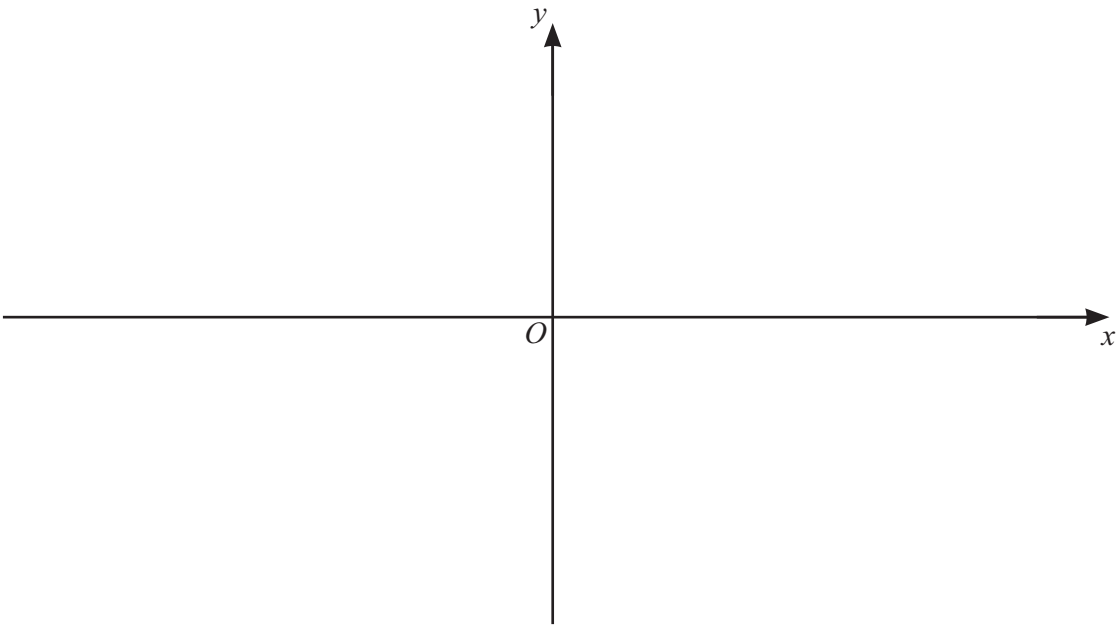
(b) For your value of a, find the range of f. [1]

(c) For your value of a, find an expression for $\mathrm{f}^{-1}(x)$. [2]

(d) It is given that the equation $\mathrm{f}(x) = \mathrm{f}^{-1}(x)$ has two roots.

For your value of a, sketch the graphs of $y = \mathrm{f}(x)$ and $y = \mathrm{f}^{-1}(x)$ on the axes.

Label each graph.
State the intercepts of each graph with the axes.
State the equations of any asymptotes. [4]



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