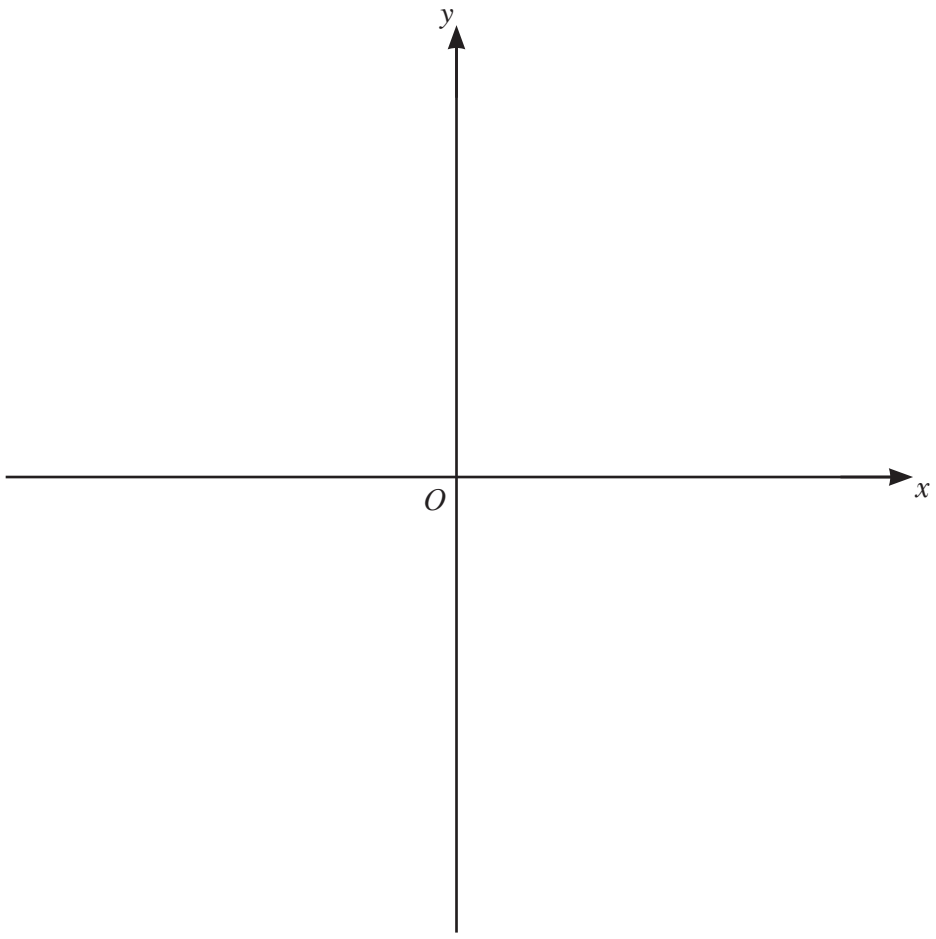
6 $\mathrm{f}(x) = x^2 + 2x - 3 \quad \text{for } x \geqslant -1$

(a) Given that the minimum value of $x^2 + 2x - 3$ occurs when $x = -1$, explain why $\mathrm{f}(x)$ has an inverse. [1]

(b) On the axes below, sketch the graph of $y = \mathrm{f}(x)$ and the graph of $y = \mathrm{f}^{-1}(x)$. Label each graph and state the intercepts on the coordinate axes.



[4]

7 A curve has equation $y = \dfrac{\ln\left(3x^2 - 5\right)}{2x + 1}$ for $3x^2 > 5$.

(a) Find the equation of the normal to the curve at the point where $x = \sqrt{2}$. [6]

(b) Find the approximate change in y as x increases from $\sqrt{2}$ to $\sqrt{2} + h$, where h is small. [1]

© UCLES 2020