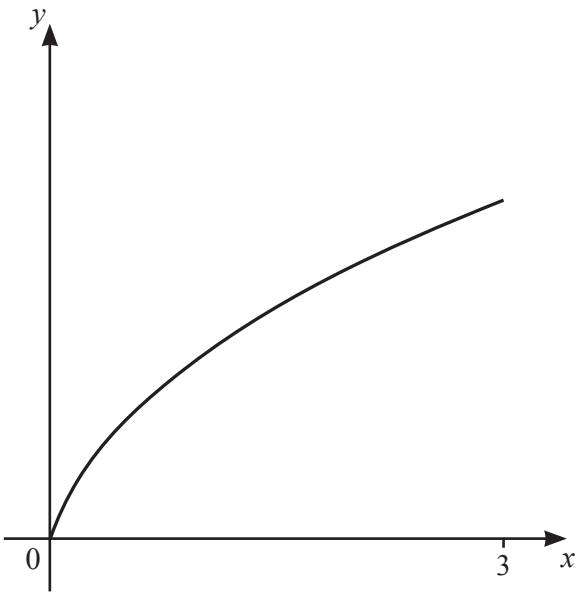
8 (a)



The diagram shows the graph of $y = \mathrm{f}(x)$ where f is defined by $\mathrm{f}(x) = \dfrac{3x}{\sqrt{5x+1}}$ for $0 \leqslant x \leqslant 3$.

(i) Given that f is a one-one function, find the domain and range of f^{-1}. [3]

(ii) Solve the equation $\mathrm{f}(x) = x$. [2]

(iii) On the diagram above, sketch the graph of $y = \mathrm{f}^{-1}(x)$. [2]

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(b) The functions g and h are defined by

$$\mathrm{g}(x) = \sqrt[3]{8x^3 + 3} \quad \text{for} \quad x \geqslant 1,$$

$$\mathrm{h}(x) = \mathrm{e}^{4x} \quad \text{for} \quad x \geqslant k.$$

(i) Find an expression for $\mathrm{g}^{-1}(x)$. [2]

(ii) State the least value of the constant k such that $\mathrm{gh}(x)$ can be formed. [1]

(iii) Find and simplify an expression for $\mathrm{gh}(x)$. [1]