

- 10) i) Expand $(8+x)^{\frac{1}{3}}$ in ascending powers of x up to and including the term in x^2 , and state the values of x for which this expansion is valid. [5]
- ii) The function $f(x) = 3 - (8+x)^{\frac{1}{3}}$ is defined for $0 \leq x \leq 19$. Find the inverse of the function $f^{-1}(x)$. [3]
- iii) Sketch the graphs of $y = f(x)$ and $y = f^{-1}(x)$ on the same axes, and show the geometrical relation between the two graphs and the line $y = x$. [3]
- iv) Show that the x -coordinates of the point of intersection of the graphs of $y = f(x)$ and $y = f^{-1}(x)$ is given by
- $$(8+x)^{\frac{1}{3}} = 3-x. \quad [2]$$
- v) Use the first two terms of the expansion of $(8+x)^{\frac{1}{3}}$ to obtain an approximation to the x -coordinate of the point intersection. Give your answer as a simple fraction. [1]

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