

(9) Inverse Functions

WORKING AT D/E

(1) $f(x) = (x + 2)^2, x \in R, x \geq -2$

(a) Write down the domain of $f(x)$

(b) Sketch the graph of $y = f(x)$

(c) Hence state the range of $f(x)$

(d) Show that the inverse function $f^{-1}(x) = \sqrt{x} - 2$

Using your answers to parts (a), (b) and (c)

(e) Sketch the graph of $y = f^{-1}(x)$ stating the domain the range of $f^{-1}(x)$

(f) Find $f^{-1}(1)$

(2) $g(x) = x^3 - 3, x \in R, x \geq 0$

(a) Find $g^{-1}(x)$ stating its domain and range.

(b) Sketch the graph of $y = g^{-1}(x)$

(3) $f(x) = x^2 - 2x - 3, x \in R$

Explain why it is not possible to find $f^{-1}(x)$

WORKING AT B/C

(1) $h(x) = \sqrt[3]{x + 6}, x \in R, x \geq -6$

(a) State the domain of $h(x)$

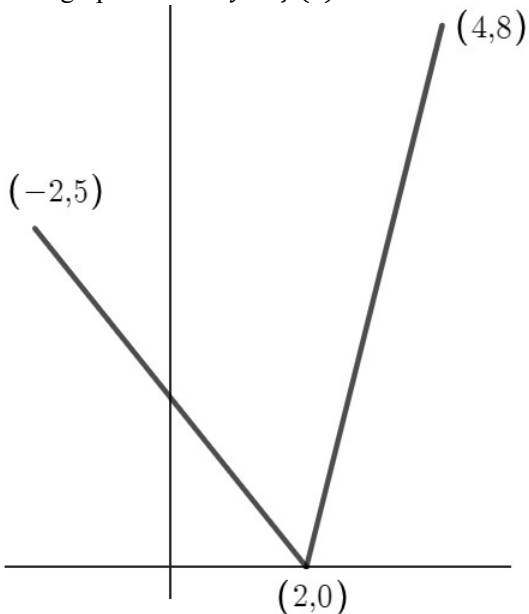
(b) Find the range of $h(x)$

(c) Find an expression for $h^{-1}(x)$

(d) State the domain and range of $h^{-1}(x)$.

(e) Solve the equation $h^{-1}(x) = h(x)$

(2) The graph below is $y = f(x)$



(a) Explain why it's not possible to find $f^{-1}(x)$

The domain of $f(x)$ is now restricted to $2 \leq x \leq 3$

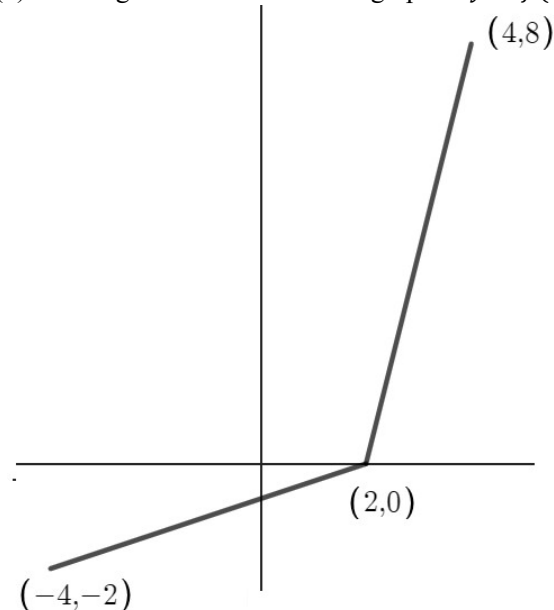
(b) Sketch the graph of $y = f^{-1}(x)$ stating its domain and range.

(3) $f: (x) \rightarrow e^{2x} + 1, x \in R.$

Find the inverse function stating its domain and range.

WORKING AT A*/A

(1) The diagram below shows the graph of $y = f(x)$



$f(x)$ is made up of two linear parts for $-4 \leq x \leq 4$

$g(x) = x(x - 3), x \in R, x > 0$

Solve the equation $fg(x) = 8$

(2) $h(x) = x^2 + 2px + q$ where p and q are positive constants.

Cyril suggests $h^{-1}(x) = -p + \sqrt{x + p^2 + q}$

Could he be correct?

(3) $t(x) = \frac{1}{x-1}, x \in R, x \neq 1$ and $s(x) = 8$

Solve the equation $s^{-1}t^{-1}(x) = x$