

1. Given $f : (-\infty, 0] \rightarrow R$, $f(x) = x^2 - 2x$, find the rule of f^{-1} .	2. Given $f(x) = 1 - \frac{1}{x^3}$, find the rule of f^{-1} .
3. Given $f : (-\infty, 0] \rightarrow R$, $f(x) = \log_e(x^2 + 1)$, find the rule of f^{-1} .	4. Given $g : [-\pi, 0] \rightarrow R$, $g(t) = \sin(2t)$, find the rule of g^{-1} .
5. Given $g : [-\pi, 0] \rightarrow R$, $g(t) = \sin(2t) $, find the rule of g^{-1} .	6. Find the rule of the inverse function of $h(\theta) = 1 - e^{-2(1-\theta)}$.
7. Express $f(x) = 2x^3 - 12x^2 + 24x - 11$ in the form $a(x+b)^3 + c$. Hence find the rule of f^{-1} .	8. Given $\sin(x+y) = \sin x \cos y + \cos x \sin y$, express $g(t) = \sin t + \cos t$ in the form $a \sin(t+b)$, where $a \in R$ and $b \in \left[0, \frac{\pi}{2}\right]$. Hence find the rule of g^{-1} .
9. Given $f(t) = e^{2t} - 2e^t$ and $t \in [0, \infty)$, find the rule of f^{-1} .	10. Given $x = y^2 + \frac{1}{y^2} + 2$, where $y \in R^+$, express y in terms of x .

Numerical, algebraic and worded answers

1. $f^{-1}(x) = 1 - \sqrt{x+1}$ 2. $f^{-1}(x) = (1-x)^{\frac{1}{3}}$ 3. $f^{-1}(x) = -\sqrt{e^x - 1}$ 4. $g^{-1}(t) = \frac{1}{2} \sin^{-1} t$
5. $g^{-1}(t) = -\frac{1}{2} \sin^{-1} t$ 6. $h^{-1}(\theta) = 1 - \log_e \frac{1}{\sqrt{1-\theta}}$ 7. $f(x) = 2(x-2)^3 + 5$, $f^{-1}(x) = \left(\frac{x-5}{2}\right)^{\frac{1}{3}} + 2$
8. $g(t) = \sqrt{2} \sin\left(t + \frac{\pi}{4}\right)$, $g^{-1}(t) = \sin^{-1}\left(\frac{t}{\sqrt{2}}\right) - \frac{\pi}{4}$ 9. $f^{-1}(t) = \log_e(1 + \sqrt{t+1})$ 10. $y = \frac{1}{2}(\sqrt{x} \pm \sqrt{x-4})$