

MATH 100 – WORKSHEET 8
INVERSE FUNCTIONS

1. MORE CHAIN RULE

$(f(g(x)))' = f'(g(x))g'(x)$

(1) Differentiate

(a) $7x + \cos(x^n)$

(b) (Final 2012) $e^{(\sin x)^2}$

(2) Is there c such that the function is differentiable for all $x > -1$?

$$f(x) = \begin{cases} \frac{\cos(x^2)}{x+1} & x \leq 0 \\ cx + x^2 + 1 & x > 0 \end{cases}$$

2. INVERSE FUNCTIONS

To find the inverse for $y = f(x)$: (1) “solve for x ”, get $x = g(y)$ (2) “exchange x, y ” to get $g(x)$.

(1) Find the function inverse to $y = x^7 + 3$.

(2) Consider the function $y = \sqrt{x - 1}$ on $x \geq 1$.

(a) Find the inverse function, in the form $x = g(y)$.

(b) Find $\frac{dy}{dx}$, $\frac{dx}{dy}$ and calculate their product.

(3) Does $y = x^2$ have an inverse?