

MEMORIAL UNIVERSITY OF NEWFOUNDLAND

DEPARTMENT OF MATHEMATICS AND STATISTICS

SECTIONS 4.3 & 4.4

Math 1090 Worksheet

FALL 2009

For practise only. Not to be submitted.

- Find $(f \circ g)(x)$ and $(g \circ f)(x)$ if $f(x) = 3x - 5$ and $g(x) = x^2 + 2x + 1$.
- Find $(f \circ g)(x)$ and the domain of $f \circ g$ given $f(x) = 5x^2 + 3$ and $g(x) = \sqrt{2x - 1}$.
- For each of the following functions F , find two non-trivial functions f and g such that $F(x) = (f \circ g)(x)$.
 - $F(x) = \sqrt{3x^3 - 5}$
 - $F(x) = \frac{4}{(1 - 5x)^3}$
- For each of the following one-to-one functions, find their inverse $f^{-1}(x)$ and give the domain and range of $f^{-1}(x)$.
 - $f(x) = \frac{1}{3}x + 2$
 - $f(x) = \sqrt{x} - 3$
 - $f(x) = 2\sqrt{x + 1}$
- Using your results from Question 4, sketch the graphs of $y = f(x)$ and $y = f^{-1}(x)$ on the same axes, for the following two functions.
 - $f(x) = \frac{1}{3}x + 2$
 - $f(x) = \sqrt{x} - 3$
- Consider the function $f(x) = x^2 + 4$.
 - Show that $f(x)$ is not one-to-one by finding two values $x = a$ and $x = b$ such that $f(a) = f(b)$.
 - The function $f(x)$ is one-to-one if we restrict the domain to $x \geq 0$. Find its inverse $f^{-1}(x)$ and the domain and range of $f^{-1}(x)$.
 - The function $f(x)$ is also one-to-one if we restrict the domain to $x \leq 0$. Find its inverse $f^{-1}(x)$ and the domain and range of $f^{-1}(x)$.