Learning Enhancement Team

University of East Anglia
STUDENT SUPPORT SERVICE

Worksheet: More Complicated Functions

More Complicated Functions study guide

Model Answers to this sheet

The questions on this worksheet you will use the functions $f(x)=3x-1$, $g(x)=3-2x^2$ and $h(x)=e^x$ to explore how to generate more complicated functions from simple ones.

1. This question uses the basics arithmetic operations of addition, subtraction, multiplication and division to make new functions.

(a) $f(x)+g(x)$ (b) $h(x)-f(x)$ (c) $f(x)g(x)$ (d) $\dfrac{h(x)}{g(x)}$

2. This question uses composition to make new functions.

(a) $f(g(x))$ (b) $g(f(x))$ (c) $f(h(x))$ (d) $h(f(x))$

(e) $g(h(x))$ (f) $h(g(x))$ (g) $f(g(h(x)))$ (h) $h(g(f(x)))$

3. Calculate the following, you should use your answers to question 2 to calculate the (e) to (l) (check that you have the correct functions before attempting (e) to (l)):

(a) $f(3)+g(-2)$ (b) $h(0)-f(4)$ (c) $f(2)g(2)$ (d) $\dfrac{h(t)}{g(2t)}$

(e) $f(g(5))$ (f) $g(f(5))$ (g) $f(h(-1))$ (h) $f(h(t))$

(i) $h(f(t^2))$ (j) $g(h(x+1))$ (k) $f(g(h(6)))$ (l) $h(g(f(1-x)))$

4. Decompose the composite functions (a)-(c) into 2 simpler functions and the composite function (d) into 3 simpler functions.

(a) $\sin(3x^2-4)$ (b) $\cos(\ln(x))$ (c) $\sqrt{x-1}$ (d) $e^{\sqrt{4t-9}}$