# Homework 3 Functional programming

1. (a) What is a programming paradigm? [1]

(b) Name **four** programming paradigms and for each one, give an example of a programming language which supports it. [8]

(i)

(ii)

(iii)

(iv)

2. (a) Use functional programming notation to define a function named trebleMinusFive, defined below.

f(x) = 3x – 5 [2]

(b) Write a function definition for a second function named doubleIt which   
returns the value of g(x) = 2x. [2]

(c) Combine the two functions in **(a)** and **(b)** to write a function h(x) which returns   
the value of

h(x) = g(f(x))

Name the function trebleThenDouble.

What will be returned when this function is applied to the parameter 4? [2]

3. In a functional programming language, variables are **immutable.**

Explain, with an example, what this means and compare the way variables can be used in the functional and procedural paradigms. [3]

4. Functional programming is **stateless** and has no **side effects**.   
Explain the meaning of these two terms. [3]

5. (a) List **two** properties of a first-class object. [2]

(b) Give **two** examples of first class objects. [2]

[Total 25 Marks]