# Homework 4 Function application

1. The function multiply3 is defined as follows:

multiply3 :: Integer 🡪 Integer 🡪 Integer 🡪 Integer

multiply3 x y z = x \* y \* z

(a) What result is returned by the following statement?

multiply3 2 4 6 [1]

(b) A further function multBySeven is defined as follows:

multBySeven x y = multiply3 7

(i) What result is returned by the following statement?

multBySeven 5 3 [1]

(ii) What is partial function application? Explain, in terms of partial function   
application, how this result is arrived at. [3]

2. (a) What is a higher-order function? [2]

(b) Explain what the **map** function does in a functional programming language   
such as Haskell. [2]

(b) Use map to write a function that doubles each element of the list [6, 9, 22, 103] [2]

3. Write statements that will define a list called listA containg several integers,   
and produce a list containing only the negative numbers from listA.  
 [3]

4.. Haskell uses a fold function.

(a) Explain what a fold function does in a functional programming language   
such as Haskell. [1]

[2]

(b) Explain the difference between foldl and foldr [1]

(c) Use a fold function to return the sum of all the numbers in a list, listA [2]

5 Write code to return names from listB = [“Albert”, “Victoria” , “Caroline”, “Maximilian”, “Frederick”, “Henry”] which are before “George” alphabetically [2]

[Total 20 Marks]