# 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]