Name of the Student: _____

**Q 1**

Write LAMBDA expressions that

(a) returns the greatest of two integers.

(b) given two integers, returns T if one or the other divides the other without remainder.

(c) given a list of integers, returns the mean.

(d) given a list of integers, returns the sum of their factorials – use your factorial solution.

**Q 2**

Write a recursive function that splits a lst into two "halves". If the length is odd, then let the first half be one item longer than the second. You can use length, if you like. For instance, `(split '(a b c d e f g h i j k l))` should give `((A B C D E F) (G H I J K L))`.

**Q 3**

Write SPLIT without using LENGTH – here we go again!

**Q 4**

Write a function REPLACE-IF, which takes three arguments: a list LST, an item ITEM and a function TEST, and replaces every element of LST that passes the TEST with ITEM. You may find using keyword arguments useful (see the lecture notes). Make use of MAPCAR, LAMBDA and FUNCALL in your solution.

**Q 5**

MAPCAR can work on any number of lists; you only need to be careful to provide a function with the correct number of arguments. For instance

```
(mapcar #'(lambda (x y) (+ x y)) '(1 2 3) '(4 5 6))
```

gives `(5 7 9)`. Don't worry if lists are not of equal length, MAPCAR goes as far as the shortest list.

Define functions that use mapcar and LAMBDA and

(a) zip two lists together – `(zip '(a b) '(1 2))` should give `((A 1) (B 2))`.

(b) take three lists: first two will be lists of integers, and the third is a list of functions. Apply the corresponding function to corresponding arguments.

**Q 6**

Write a recursive function ZIPP that takes a list of lists and zips them all – `(zipp '(a b) '(1 2) '(p q))` should give `((A 1 P) (B 2 Q))`, and so on.