2002 Paper 13 Question 10

Introduction to Functional Programming

(*a*) Write an ML function `merge` of type

```
('a * 'a -> bool) -> ('a list * 'a list) -> 'a list
```

which takes a comparison function of type `'a * 'a -> bool` and gives a function for merging two lists of type `'a` according to this function. [6 marks]

(*b*) Use your function `merge` to write a curried polymorphic function `mergesort` which takes a comparison function f and yields a sorting function of the appropriate type. [6 marks]

(*c*) Write a function `sumcomp` which takes two integer lists and returns the boolean value `true` if the sum of integers in the first list is no greater than the sum of integers in the second list and `false` otherwise. [6 marks]

(*d*) What is the type of the expression `mergesort sumcomp`? [2 marks]