

Show **ALL** work for credit; be neat; and use only **ONE** side of each page of paper.

1. Solve $s_n = 5s_{n-1} + 3 \cdot 2^n; s_0 = 1$.

2. Assuming Concatenate halts, prove by strong induction on the length of the list s that the algorithm Q halts.

```
List Q ( List s )
  if the length of the list is less than or equal 1
    return s
  else let k be an element of s and form three lists
    s1 is the list of elements of s that are less than k
    s2 is the list with just k
    s3 is the list of elements of s that are greater than k
  return Concatenate( Q(s1), s2, Q(s3) )
```