

## Solution Sheet 9, July 26, 2012

### Answers

1. There are 49 ways, and even more methods of arriving at this answer. Perhaps the easiest is to use cases starting with using 0; 1 or 2 50 coins.
2. (a) 11002222  
 (b)  $220200_3 = 2 \cdot 3^5 + 2 \cdot 3^4 + 0 \cdot 3^3 + 2 \cdot 3^2 + 0 \cdot 3^1 + 0 \cdot 3^0 = 666$
3. sub in  $x = 0$  to find  $a_0$ ;  $x = 1$  to find  $a_0 + a_1 + \dots + a_{18}$ ;  $a_1$  and  $a_{16}$  can be found using

$$(1-y)(1-x) < \frac{1}{4y}$$

$$(1-y)(1-x) < \frac{(1-y)(4y-1)}{4y}$$

But  $(1-y)(4y-1) < y$  for all values of  $y$  (verification left to the reader). So

$$(1-y)(1-x) < \frac{(1-y)(4y-1)}{4y} < \frac{y}{4y} = \frac{1}{4}$$