Concepts

r-combinations with repetition	permutations with indistinguishable elements

Problem Solutions

0. Review the proofs about choosing r objects from n objects with repetition and counting permutations when some elements are indistinguishable. Make sure the formulas make sense to you, and if they don't, ask about them.

1. A bank has unlimited numbers of bills in denominations $2, 3, 5, 7, 11, 13, 17, 19$ (it's a prime bank). How many ways are there to select

(a) 6 bills?

(b) 13 bills with at least one of each kind?

(c) 15 bills with no more than one 7?

(d) 15 bills with no more than two 5's and at least three 3's?

2. How many ways are there to travel from $(0, 0, 0)$ to $(7, 5, 4)$ in 3 dimensional space if you're allowed to take unit-length steps in the positive x, y, and z directions?

3. Suppose you're organizing a phone survey with a team of 5 people (Meredith, Mikayla, Mariel, May, and Molly) and have a list of 50 phone numbers. How many ways are there to give Meredith 2 numbers, Mikayla 4 numbers, Mariel 6 numbers, May 8 numbers, and Molly 10 numbers?

4. How many ways are there to distribute 5 chocolate bars in 3 boxes if you can't distinguish between bars of the same flavor, each box must have at least 1 bar in it, and

(a) the chocolate bars are all different flavors and the boxes are labeled?

(b) the chocolate bars are all different flavors and the boxes are unlabeled?

(c) the chocolate bars are all the same flavor and the boxes are labeled?

(d) the chocolate bars are all the same flavor and the boxes are unlabeled?