

**Math 213, Section B1 (Solution), Quiz 5; February 15, 2008**

**1.**

A basket contains oranges, apples, pears and grapefruits. How many ways of choosing five pieces of fruit are there, so that exactly one of the pieces chosen is an apple?

Provide a detailed explanation of your answer.

**Solution.**

To choose five pieces of fruit so that exactly one is an apple we have to pick an apple from a basket and put it aside (there is exactly one way to do that) and then pick four pieces of fruit out of oranges, pears and grapefruits.

Therefore the number we are asked to find is equal to the number of ways to choose  $r = 4$  pieces of fruit out of the basket containing  $n = 3$  types of fruit: oranges, pears and grapefruits. This number is equal to the number of 4-combinations with repetitions out of a set with 3 elements, that is, it is equal to:

$$C(r + n - 1, n - 1) = C(4 + 3 - 1, 3 - 1) = C(6, 2) = \frac{6 \cdot 5}{1 \cdot 2} = 15.$$