**Math 386 Quiz 2** (2009/9/22) SOLUTIONS
**Justify all answers, except where stated.**

(1) [10 points.] What $r$-combination of what multiset $M$ corresponds to the sequence

$$aaaa|aa|||aaa\ ?$$

What is the value of $r$? What is the number of types in $M$ (i.e., $k$)?

$M = \underline{\{\infty \cdot a_1, \infty \cdot a_2, \infty \cdot a_3, \infty \cdot a_4, \infty \cdot a_5\}}$ $r = \underline{9}$ $k = \underline{5}$

The 9-combination is $\{4 \cdot a_1, 2 \cdot a_2, 0 \cdot a_3, 0 \cdot a_4, 3 \cdot a_5\}$.

It's important to know which is the size of the combination and which is the number of types in the multiset. Also, I'd like you to know the difference between the multiset $M$ from which the combination is taken, and the combination itself.

(2) [5 points.] What sequence of $a$'s and |'s corresponds to the solution $(3, 4, 5, 4, 3, 2, 0)$ of the equation $x_1 + x_2 + \cdots + x_7 = 21$?

$aaa|aaaa|aaaaa|aaaa|aaa|aa|$

It's really important to know how many |s to put in. If you don't, you don't understand the method here. I don't care about writing down sequences; it's understanding the technique that counts.

(3) [5 points.] What combination from $\{\infty \cdot a_1, \ldots, \infty \cdot a_7\}$ corresponds to the solution $(3, 4, 5, 4, 3, 2, 0)$ of the equation $x_1 + x_2 + \cdots + x_7 = 21$?

$\{3 \cdot a_1, 4 \cdot a_2, 5 \cdot a_3, 4 \cdot a_4, 3 \cdot a_5, 2 \cdot a_6, 0 \cdot a_7\}$.

Am I asking for a *combination* or for a *number*? (Guess.)

(4) [5 points.] What combination from $\{\infty \cdot a_1, \ldots, \infty \cdot a_7\}$ corresponds to the solution $(3, 4, 8, 4, 3, 2, -4)$ of the equation $x_1 + x_2 + \cdots + x_7 = 21$?

None. You can't have a combination where an element has negative multiplicity.

So you think it's a trick question? I expect you to be paying attention!