2 About Quiz 2:

The first question was:

How many zeroes are at the end of the number 100!? Noone got this correct. The answer was 24. The formula explained in class was

Theorem 2.1. *If p is prime then the number of times that p divides $n!$ is equal to*

$$\left[\frac{n}{p}\right] + \left[\frac{n}{p^2}\right] + \left[\frac{n}{p^3}\right] + \cdots$$

Proof. Dividing n by p gives

$$n = pq + r$$

where $0 \leq r < p$. Then the only factors of $n!$ which are divisible by p are

$$p, 2p, 3p, \cdots qp.$$

The product of these numbers is p^q times $q!$. By induction the number of times that p divides this product is

$$q + \left[\frac{q}{p}\right] + \left[\frac{q}{p^2}\right] + \left[\frac{q}{p^3}\right] + \cdots$$

But $q = [n/p]$, $[q/p] = [n/p^2]$, etc., proving the theorem. □

Almost everyone got the induction question correct but did not have enough words in the proof.

The last words should be something like: "Since the product of two odd numbers is odd, the answer has the required form for $n + 1$. Therefore the equation holds for all $n \geq 1$."