True/False - No explanation needed. (For each: 1 point if correct, 0 points if not answered, -1 points if incorrect)

1. The coefficient of $x^3 y^2$ in $(x+y)^6$ is 0 because $2+3 \neq 6$; yet, it appears twice in the expanded form of $(x+y)^5$. True/False

   True. It appears once as the coefficient of $x^3 y^2$ and once as the coefficient of $x^2 y^3$

2. A counterexample is a situation where the hypothesis (conditions) of a statement are satisfied but the conclusion is false. True/False

   True

Problems - Need justification.

1. How many ways are there to have 5 men and 9 women stand in a line so that no two men are standing next to each other? We don't need the actual integer, just a formula for the number. (10 points)

   It's probably easiest to order the women first. Once the women are placed, there are 10 spots in which we can place men. One spot in front of each woman, and then a spot at the end. We choose 5 of these spots to place the men. Finally the men are ordered. Our final answer is therefore $9! \cdot \binom{10}{5} \cdot 5! = \frac{9! \cdot 10!}{5!}$.