1) Consider the expression $(x + 2y + 3z)^{34}$. Find the coefficient of $x^{10}y^{15}z^9$.

2) The grid below depicts the possible routes that a drop of water may take while flowing down the face of a rock. (Yeah, it's oversimplified, but this drop of water is very particular about its pathing!). How many different routes are there for the drop of water to get from the top to the bottom?
If you express your answer using a recurrence relation, be sure to specify enough information so that the answer can be calculated from your answer.