1. How many solutions are there to the equation

\[ x_1 + x_2 + x_3 + x_4 + x_5 = 33 \]

where \( x_1, \ldots, x_5 \) are integers with \( x_1 \geq 0, x_2 \geq 1, x_3 \geq -2, x_4 \geq 0, \) and \( x_5 \geq 3? \)

We will write the equation as

\[(x_1+1) + x_2 + (x_3+3) + (x_4+1) + (x_5-2) = 36\]

If we let \( y_1 = x_1+1, \ y_2 = x_2, \ y_3 = x_3+3, \ y_4 = x_4+1, \) and \( y_5 = x_5-2, \) then we need to count the number of solutions of

\[ y_1 + y_2 + y_3 + y_4 + y_5 = 36 \]

subject to \( y_1 \geq 1, y_2 \geq 1, y_3 \geq 1, y_4 \geq 1, y_5 \geq 1. \)

By the method of dots and lines, the answer is \( \binom{35}{4}. \)