2) (10 pts) ANL (Summations and Algorithm Analysis)

Find the closed form solution in terms of n for the following summation. Be sure to show all your work.

$$\sum_{i=n}^{3n}\sum_{j=1}^{n-2} j$$

$$= \sum_{i=n}^{3n} \frac{(n-2)(n-1)}{2}$$

$$= \frac{(3n-n+1)(n-2)(n-1)}{2}$$

$$= \frac{(2n+1)(n-2)(n-1)}{2}$$

In the second step, we are summing a constant with respect to the summation index i, thus we can simply multiply the item being summed by the number of times it's summed.

Note, also accepted is the polynomial multiplied out:

$$= \frac{2n^3 - 5n^2 + n + 2}{2}$$

Grading: 5 pts for solving the inner summation, 5 pts for then solving the outer summation, grader decides partial credit within each part.