

Dice = N - sided

No. of rolls = n

$$avg_{score} = \left(1 - \left(\frac{N-1}{N}\right)^n\right) + \frac{n \times \sum_{i=2}^N i}{N-1} \times \left(\frac{N-1}{N}\right)^n$$

For N = 6, the max-scoring n is 6

For N = 4, the max-scoring n is 4