# Task 2 - Probability (Discrete)

## Two 6s in five rolls

What is the probability of rolling exactly two 6s in five rolls of a fair die?

fórmula da distribuição binomial:

P(X = k) = pk ⋅ (1− p)n−k

Onde:

* n é o número total de tentativas.
* k é o número de sucessos (número de 6s).
* p é a probabilidade de um único sucesso.

Calculando:

P(X = 2) = ⋅ p2 ⋅ (1− p)5−2

Where:

* is the binomial coefficient.
* p is the probability of rolling a 6, which is
* 2 é o número de sucessos.
* 5 is the number of rolls.

Calculating the binomial coefficient:

= = = 10

Substituting in the formula:

P(X = 2) = 10 ⋅ 2 ⋅ 3

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P(X = 2) =

P(X = 2) = 0.1607

The probability of rolling exactly two 6s in five rolls of a fair die is approximately **0.1607** or **16.07%.**

## Probability of two accidents in a specific week

The number of industrial injuries on average per working week in a factory is 0.75. Assuming that the distribution of injuries follows a Poisson distribution, find the probability that in a particular week there will be no more than two accidents.

Poisson distribution formula:

Where:

* *e* is the base of the natural logarithm (approximately 2.71828).
* λ (lambda) is the mean occurrences of events in a fixed interval.
* *k* is the number of events we are interested in.

Substituting in the formula:

The probability that in a specific week there are no more than two accidents is **0.1329** or **13.29%.**