

Exam VWO Math C

Formula sheet

Rules for random variables

For two random variables X and Y , we have:

$$E(X + Y) = E(X) + E(Y)$$

For two independent random variables X and Y , we have:

$$\sigma(X + Y) = \sqrt{(\sigma(X))^2 + (\sigma(Y))^2}$$

If you have n independent random experiments, each with the same random variable X , then the following holds for the sum S and the mean \bar{X} :

$$E(S) = n \cdot E(X)$$

$$E(\bar{X}) = E(X)$$

$$\sigma(S) = \sqrt{n} \cdot \sigma(X)$$

$$\sigma(\bar{X}) = \frac{\sigma(X)}{\sqrt{n}}$$

Binomial distribution

For a binomially distributed random variable X , where n is the number of trials and p the probability of success, the probability of k successes is equal to:

$$P(X = k) = \binom{n}{k} \cdot p^k \cdot (1 - p)^{n-k}$$

Furthermore: $E(X) = n \cdot p$ and $\sigma(X) = \sqrt{n \cdot p \cdot (1 - p)}$

Normal distribution

If X is normally distributed with mean μ and standard deviation σ , then:

$$Z = \frac{X - \mu}{\sigma} \text{ follows a standard normal distribution with: } P(X \leq g) = P\left(Z \leq \frac{g - \mu}{\sigma}\right)$$