Font Comparison for Probability Cheatsheet
Choose Your Preferred Academic Font

1 1. Computer Modern (Default LaTeX)

1.1 Fundamental Definitions

Random Variable A function $X : \Omega \to \mathbb{R}$ that assigns a real number to each outcome in the sample space Ω.

Independence Events A and B are independent if:

$$P(A \cap B) = P(A)P(B)$$
$$P(A|B) = P(A)$$

1.2 Key Probability Rules

Bayes' Theorem: $P(A|B) = \frac{P(B|A)P(A)}{P(B)}$
Law of Total Probability: For partition $\{B_i\}$: $P(A) = \sum_i P(A|B_i)P(B_i)$

1.3 Expected Value

The average value of a random variable:

$$E(X) = \sum_x x \cdot P(X = x) \text{ (discrete)}$$

$$E(X) = \int_{-\infty}^{\infty} x f(x) dx \text{ (continuous)}$$

Linearity: $E(aX + bY + c) = aE(X) + bE(Y) + c$
Variance: $\text{Var}(X) = E(X^2) - [E(X)]^2$

1.4 Common Distributions

Binomial: $X \sim \text{Bin}(n, p)$ has PMF $P(X = k) = \binom{n}{k} p^k (1-p)^{n-k}$
Poisson: $X \sim \text{Pois}(\lambda)$ has PMF $P(X = k) = \frac{\lambda^k e^{-\lambda}}{k!}$
Normal: $X \sim \mathcal{N}(\mu, \sigma^2)$ has PDF $f(x) = \frac{1}{\sqrt{2\pi\sigma^2}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$
Properties: $E(X) = \mu$, $\text{Var}(X) = \sigma^2$

To use: No package needed (default LaTeX font) newtxtext,newtxmath

2 2. Times New Roman (Most Professional)

2.1 Fundamental Definitions

Random Variable A function $X : \Omega \to \mathbb{R}$ that assigns a real number to each outcome in the sample space Ω.

Independence Events A and B are independent if:

$$P(A \cap B) = P(A)P(B)$$
$$P(A|B) = P(A)$$

2.2 Key Probability Rules

Bayes' Theorem: $P(A|B) = \frac{P(B|A)P(A)}{P(B)}$
Law of Total Probability: For partition $\{B_i\}$: $P(A) = \sum_i P(A|B_i)P(B_i)$

2.3 Expected Value

The average value of a random variable:

$$E(X) = \sum_x x \cdot P(X = x) \text{ (discrete)}$$

$$E(X) = \int_{-\infty}^{\infty} xf(x)dx \text{ (continuous)}$$

Linearity: $E(aX + bY + c) = aE(X) + bE(Y) + c$
Variance: $\mathrm{Var}(X) = E(X^2) - [E(X)]^2$

2.4 Common Distributions

Binomial: $X \sim \mathrm{Bin}(n, p)$ has PMF $P(X = k) = \binom{n}{k}p^k(1-p)^{n-k}$
Poisson: $X \sim \mathrm{Pois}(\lambda)$ has PMF $P(X = k) = \frac{\lambda^k e^{-\lambda}}{k!}$
Normal: $X \sim \mathcal{N}(\mu, \sigma^2)$ has PDF $f(x) = \frac{1}{\sqrt{2\pi\sigma^2}}e^{-\frac{(x-\mu)^2}{2\sigma^2}}$
Properties: $E(X) = \mu$, $\mathrm{Var}(X) = \sigma^2$

To use: `\usepackage{newtxtext,newtxmath}` mathpazo

3 3. Palatino (Academic Elegance)

3.1 Fundamental Definitions

Random Variable A function $X : \Omega \to \mathbb{R}$ that assigns a real number to each outcome in the sample space Ω.

Independence Events A and B are independent if:

$$P(A \cap B) = P(A)P(B)$$
$$P(A|B) = P(A)$$

3.2 Key Probability Rules

Bayes' Theorem: $P(A|B) = \frac{P(B|A)P(A)}{P(B)}$
Law of Total Probability: For partition $\{B_i\}$: $P(A) = \sum_i P(A|B_i)P(B_i)$

3.3 Expected Value

The average value of a random variable:

$$E(X) = \sum_x x \cdot P(X = x) \text{ (discrete)}$$

$$E(X) = \int_{-\infty}^{\infty} x f(x) dx \text{ (continuous)}$$

Linearity: $E(aX + bY + c) = aE(X) + bE(Y) + c$
Variance: $\text{Var}(X) = E(X^2) - [E(X)]^2$

3.4 Common Distributions

Binomial: $X \sim \text{Bin}(n, p)$ has PMF $P(X = k) = \binom{n}{k} p^k (1-p)^{n-k}$
Poisson: $X \sim \text{Pois}(\lambda)$ has PMF $P(X = k) = \frac{\lambda^k e^{-\lambda}}{k!}$
Normal: $X \sim \mathcal{N}(\mu, \sigma^2)$ has PDF $f(x) = \frac{1}{\sqrt{2\pi\sigma^2}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$
Properties: $E(X) = \mu$, $\text{Var}(X) = \sigma^2$

To use: `\usepackage{mathpazo}`

charter

4 4. Charter (Clean & Readable)

4.1 Fundamental Definitions

Random Variable A function $X : \Omega \to \mathbb{R}$ that assigns a real number to each outcome in the sample space Ω.

Independence Events A and B are independent if:

$$P(A \cap B) = P(A)P(B)$$
$$P(A|B) = P(A)$$

4.2 Key Probability Rules

Bayes' Theorem: $P(A|B) = \frac{P(B|A)P(A)}{P(B)}$
Law of Total Probability: For partition $\{B_i\}$: $P(A) = \sum_i P(A|B_i)P(B_i)$

4.3 Expected Value

The average value of a random variable:

$$E(X) = \sum_x x \cdot P(X = x) \text{ (discrete)}$$

$$E(X) = \int_{-\infty}^{\infty} xf(x)dx \text{ (continuous)}$$

Linearity: $E(aX + bY + c) = aE(X) + bE(Y) + c$
Variance: $\mathrm{Var}(X) = E(X^2) - [E(X)]^2$

4.4 Common Distributions

Binomial: $X \sim \mathrm{Bin}(n, p)$ has PMF $P(X = k) = \binom{n}{k}p^k(1-p)^{n-k}$
Poisson: $X \sim \mathrm{Pois}(\lambda)$ has PMF $P(X = k) = \frac{\lambda^k e^{-\lambda}}{k!}$
Normal: $X \sim \mathcal{N}(\mu, \sigma^2)$ has PDF $f(x) = \frac{1}{\sqrt{2\pi\sigma^2}}e^{-\frac{(x-\mu)^2}{2\sigma^2}}$
Properties: $E(X) = \mu$, $\mathrm{Var}(X) = \sigma^2$

To use: `\usepackage{charter}`

Font Comparison Summary

Quick Comparison Guide:

Times New Roman	Most professional, widely recognized
Palatino	Elegant, excellent for academic work
Charter	Clean, great readability for dense math
Computer Modern	Classic LaTeX, familiar to academics

My Recommendation:
For a probability cheatsheet that needs to look serious and professional, **Times New Roman** provides the best balance of professionalism and mathematical readability.

Instructions:

1. Review each font option in this PDF
2. Choose your preferred font
3. Add the corresponding package to your main cheatsheet file
4. Recompile to see the change