
Probability and Inference Worksheet

Synthetic formulas, symbols, bullet lists, and boxed sections for parse diversity

Common Formulas

- Bayes: $P(A|B) = P(B|A)P(A) / P(B)$
- Expectation: $E[X] = \sum x \cdot p(x)$
- Variance: $\text{Var}(X) = E[(X - \mu)^2]$
- Gaussian: $p(x) = (1 / \sqrt{2\pi\sigma^2}) \exp(-(x - \mu)^2 / (2\sigma^2))$
- Covariance matrix: $\Sigma = E[(x - \mu)(x - \mu)^T]$

Quick Notes

Use log-space when multiplying many probabilities.
For binary classification, $\text{BCE} = -(y \log p + (1-y) \log(1-p))$.
For Gaussian models, check whether Σ is diagonal, full, or shared.