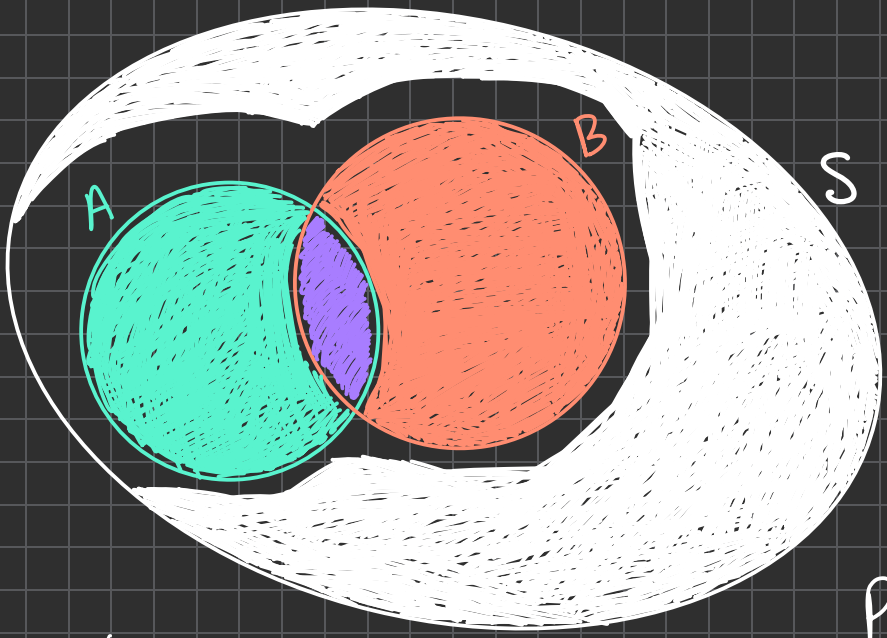
Unit 2



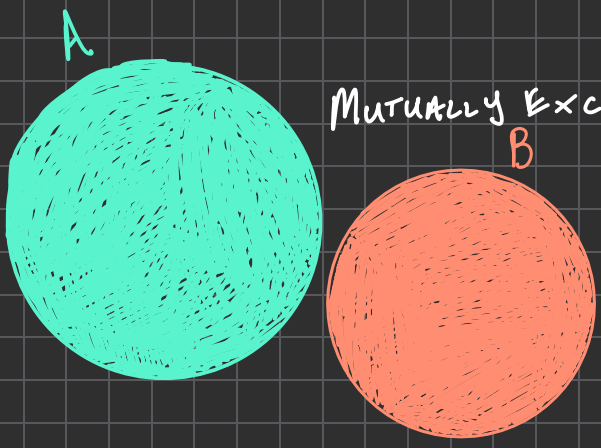
$P(S) = 1$

$P(A) =$

$P(B) =$

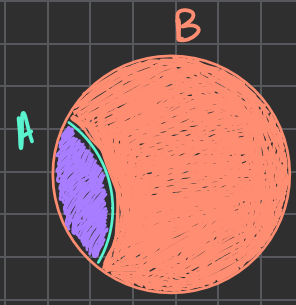
$P(A \cap B) =$

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$



Mutually exclusive

$P(A \cap B) = 0$

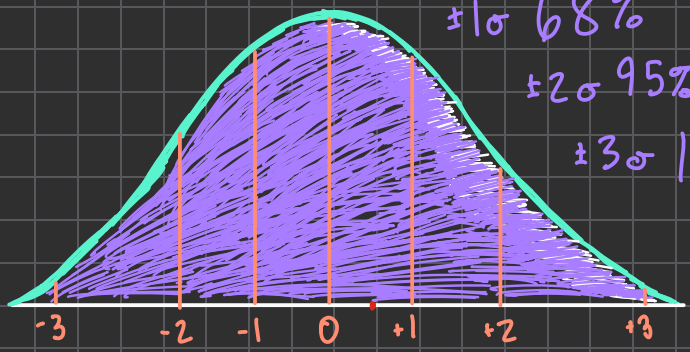


Under independence:

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

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

$$A^c = 1 - A$$

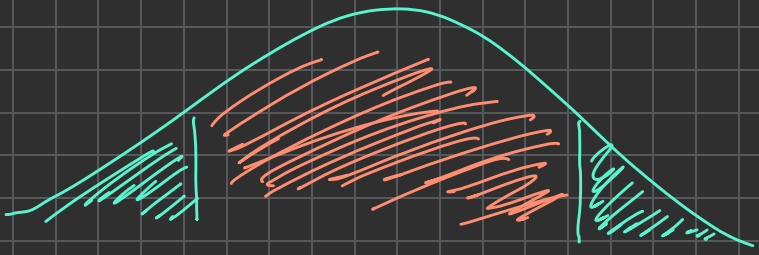


$$Z \sim N(0,1)$$

$$P(z > 0.58) = 1 - P(z < 0.58)$$

$$X \sim N(5, 25) \quad Z = \frac{X - \mu}{\sigma} = \frac{10 - 5}{5} = 1$$

$$P(X > 10) = P(z \geq 1)$$



BERNOULLI → COIN FLIP

BINOMIAL → SUM OF BERNOULLI

POISSON → COUNTS OF THINGS

ONLY CARE TO CLASSIFY RESPONSE

NORMAL → $-\infty < x < \infty$

GAMMA → $0 \leq x < \infty$ time

BETA → $0 \leq x \leq 1$ PROBABILITY

$X \sim N(\mu_{\bar{x}}, \frac{\sigma}{\sqrt{n}})$ $n \to \infty$ "EVERYTHING IS RIGHT"

$\mu_{\bar{x}} = \mu = \bar{x}$ $n > 30$ "EVERYTHING WORKS"

$S = \frac{s}{\sqrt{n}} \approx \sigma$

$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$