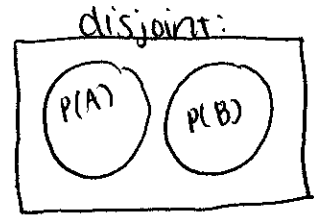
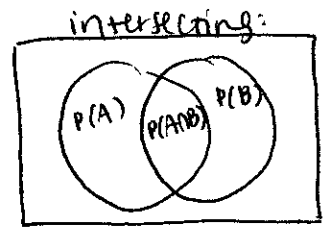


Probability:

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

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



this = 0  
when events  
are disjoint

conditional:

$$P(B|A) = \frac{P(A \text{ and } B)}{P(A)}$$

intersection

"B given A"

When events are independent:  $P(A \cap B) = P(A) \cdot P(B)$

When events are not independent:  $P(A \cap B) = P(A) \cdot P(B|A)$

to check independence:

$$\begin{aligned} P(B|A) &= P(B) \\ \frac{P(A \text{ and } B)}{P(A)} &= P(B) \end{aligned}$$

Random variables:

constants:

$$E(ax) = a \cdot E(x)$$

$$\text{var}(ax) = a^2 \cdot \text{var}(x)$$

$$\text{SD}(ax) = a \cdot \text{SD}(x)$$

$$E(x \pm b) = E(x) \pm b$$

$$\text{var}(x \pm b) = \text{var}(x)$$

$$\text{SD}(x \pm b) = \text{SD}(x)$$

combining:

$E(x) =$

$$E(x \pm y) = E(x) \pm E(y)$$

$$\text{var}(x \pm y) = \text{var}(x) + \text{var}(y)$$

$$\text{SD}(x \pm y) = \sqrt{\text{SD}(x)^2 + \text{SD}(y)^2}$$

Binomial:

$n=10$   
 $p=0.3$

$$P(X=3) = \text{binompdf}(n=10, p=0.3, x=3)$$

$$P(X > 3) = 1 - P(X \leq 3)$$

$$= \text{binomcdf}(n=10, p=0.3, x=3)$$

0 1 2 3 4 5 ...

$$P(X \geq 3) = 1 - P(X \leq 2)$$

$$= 1 - \text{binomcdf}(\dots, x=2)$$

0 1 2 3 4 5 ...

$$P(X < 3) = P(X \leq 2)$$

$$= \text{binomcdf}(\dots, x=2)$$

0 1 2 3 4 5 ...

$$P(X \leq 3) = \text{binomcdf}(\dots, x=3)$$

0 1 2 3 4 5 ...

- Binary outcomes
- Independent events
- Number of trials is set
- Success probability is constant