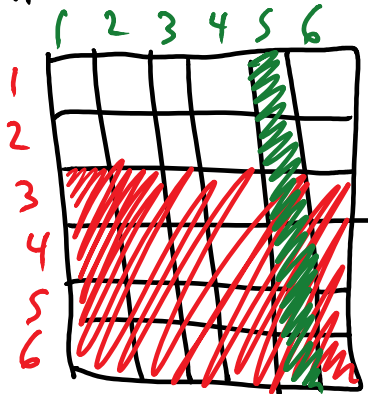


Independent Events Say events A, B are independent

if $P(A \cap B) = P(A)P(B)$. Otherwise, say A, B are dependent.

Roll two dice

Define A as the event red die shows value ≥ 3
 B as the event green die shows value 5



"red" outcomes are in A

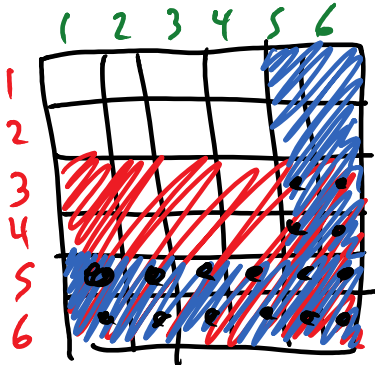
"green" outcomes are in B

$$P(A \cap B) = \frac{4}{36} = \frac{1}{9} \quad P(A) = \frac{24}{36} = \frac{2}{3} \quad P(B) = \frac{6}{36} = \frac{1}{6}$$

$$P(A \cap B) = \frac{1}{9} = \frac{2}{3} \cdot \frac{1}{6} = P(A)P(B).$$

So events A and B are independent. ✓

Event C as the event maximum of the two dice is 5 or greater.



Event A is that red die ≥ 3 .

$$P(A) = \frac{24}{36} = \frac{2}{3} \quad P(C) = \frac{20}{36} = \frac{5}{9}$$

$$P(A \cap C) = \frac{16}{36} = \frac{4}{9} = \frac{12}{27} \quad \text{So } P(A \cap C) \neq P(A)P(C)$$

$P(A)P(C) = \frac{2}{3} \cdot \frac{5}{9} = \frac{10}{27}$ So A, C not independent.
 Instead A, C dependent events.