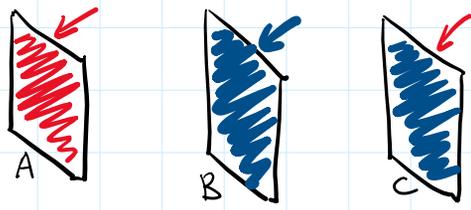


Warm-Up: A hat contains 3 cards, identical in form, except that both sides of one card are red, both sides of another card are blue, and the third card contains one blue and one red side. One card is randomly selected from the hat and placed on a table. **If** the visible side of the chosen card is red, what is the probability that the other side of that card is also red?

Conditional probability

event A occurred



Events: A: red-red card selected, B: blue-blue card selected
 C: red-blue card selected
 R: visible side of card on table is red

Want: $P(A | R) = \frac{P(A \cap R)}{P(R)} \stackrel{\text{multiplication rule}}{=} \frac{P(R | A) P(A)}{\frac{1}{2}} = \frac{1 \cdot \frac{1}{3}}{\frac{1}{2}} = \boxed{\frac{2}{3}}$

↑ definition of conditional probability

A	B	C
RR		

Law of Total Probability:

$$P(R) = P(R|A)P(A) + P(R|B)P(B) + P(R|C)P(C)$$

$$= 1 \cdot \frac{1}{3} + 0 \cdot \frac{1}{3} + \frac{1}{2} \cdot \frac{1}{3} = \frac{1}{2}$$