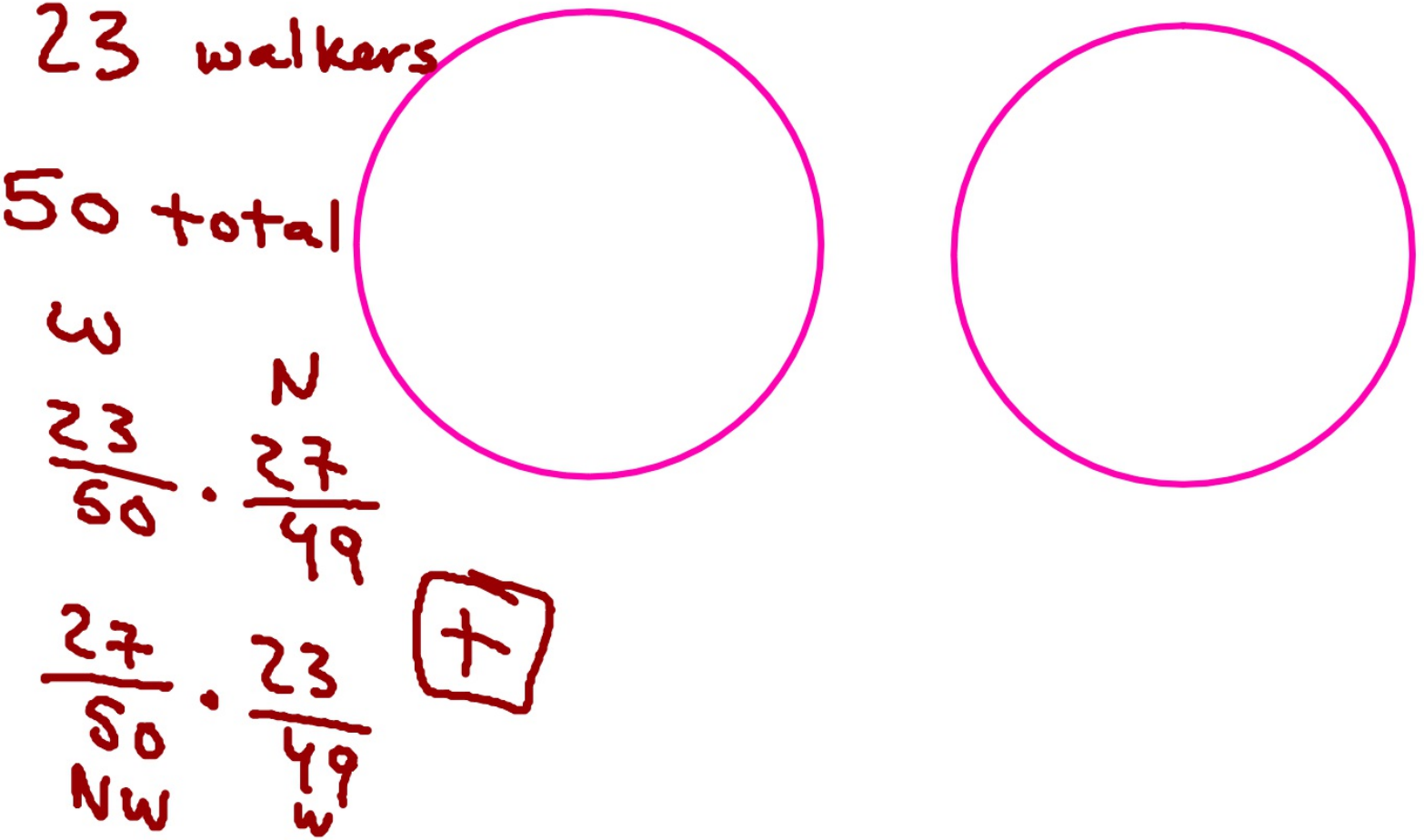
What does "mutually exclusive" mean?

What does "combined" probability mean?



Probability of an event A	$\mathrm{P}(A) = \dfrac{n(A)}{n(U)}$
Complementary events	$\mathrm{P}(A) + \mathrm{P}(A') = 1$
Combined events	$\mathrm{P}(A \cup B) = \mathrm{P}(A) + \mathrm{P}(B) - \mathrm{P}(A \cap B)$
Mutually exclusive events	$\mathrm{P}(A \cup B) = \mathrm{P}(A) + \mathrm{P}(B)$
Conditional probability	$\mathrm{P}(A \cap B) = \mathrm{P}(A)\,\mathrm{P}(B \mid A)$
Independent events	$\mathrm{P}(A \cap B) = \mathrm{P}(A)\,\mathrm{P}(B)$

Or

given that somethi else occurr

Today's learning objective:

By the end of class, I will understand what independent, dependent, mutually exclusive, combined, complementary, and conditional probabilities are.

Today's language objective:

I will discuss probability terminology in small groups.

So Rogers, you need to go to Vegas and follow this gambling strategy.

What about playing Texas Hold'em Poker...

What's the probability of getting pocket rockets?

(conditional A A

$$\frac{4}{52} \cdot \frac{3}{51} \approx .005$$

.5%

Complementary: P(A) + P(A') = 1

Combined (think overlapping Venn Diagram):

Independent (think Roulette spins):

Conditional (Dependent - think cards):

Mutually Exclusive (think separate Venns):

Suppose a box contains 3 blue markers and 12 black markers. Two markers are chosen from the box without replacement. What is the probability that upon withdrawing 2 markers you find 1 is blue and 1 is black?

$$\frac{3}{15}\cdot\frac{12}{14}+\frac{12}{15}\cdot\frac{3}{14}=34.3\%$$

Probability of an event A	$\mathrm{P}(A)=\dfrac{n(A)}{n(U)}$
Complementary events	$\mathrm{P}(A)+\mathrm{P}(A')=1$
Combined events	$\mathrm{P}(A\cup B)=\mathrm{P}(A)+\mathrm{P}(B)-\mathrm{P}(A\cap B)$
Mutually exclusive events	$\mathrm{P}(A\cup B)=\mathrm{P}(A)+\mathrm{P}(B)$
Conditional probability	$\mathrm{P}(A\cap B)=\mathrm{P}(A)\mathrm{P}(B\mid A)$
Independent events	$\mathrm{P}(A\cap B)=\mathrm{P}(A)\,\mathrm{P}(B)$

1) Of voters in a recent election, 57% were male, 64% were Democrat, and 35% were both male and Democrat.

a) What is the probability that a voter chosen at random is female? 43%

b) What is the probability that a voter chosen at random is either male or Democrat? 86%

c) Is being male or Democrat ~~independent~~ of each other?

d) ~~Is being male~~ or Democrat mutually exclusive? No

(.57)(.64)
.3648

Combined events	$P(A \cup B) = P(A) + P(B) - P(A \cap B)$
Mutually exclusive events	$P(A \cup B) = P(A) + P(B)$
Conditional probability	$P(A \cap B) = P(A)P(B \mid A)$
Independent events	$P(A \cap B) = P(A)\,P(B)$

M·D

1) A rocket being launched has three engines that are independent of each other. The probability of a single engine firing is .97. What is the probability of at least one engine not firing?

$P(F') = .03$

$(.97)^3 = .913$

.087

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Complementary events	$\mathrm{P}(A) + \mathrm{P}(A') = 1$
Combined events	$\mathrm{P}(A \cup B) = \mathrm{P}(A) + \mathrm{P}(B) - \mathrm{P}(A \cap B)$
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AND = X

OR = +

1) The probability of rain on Monday is 30% and on Thursday is 40%. Assuming these are independent, what is the probability that

a) it rains on both days? 12%

b) it does not rain on Monday? 70%

c) it rains on Monday, but not Thursday? 18%

d) it rains on at least one of these days? 58%

e) it doesn't rain on either day? 42%