

Unit 2 Day 2
Probability
(4-2) The Addition Rules
Probability

Feb 12-2:04 PM

Mutually Exclusive Events: two events are that cannot occur at the same time (i.e. they have no outcomes in common)

In a school you may wish to know the probability that a person randomly selected will have passed math.

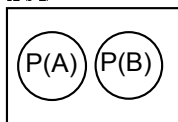
There are only two outcomes

1. Pass
2. Fail (can't do both)

Feb 12-2:04 PM

The word "or": How many times does one or the other occur? (add both)

Mutually Exclusive
 $P(A \text{ or } B) = P(A) + P(B)$



Example

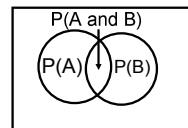
What is the probability of drawing a 5 or a 7?

Sep 10-11:54 AM

The word "or": How many times does one or the other occur?

Not mutually exclusive

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



Example

What is the probability of drawing a red card or a 10?

$$\frac{26}{52} + \frac{4}{52} - \frac{2}{52} = \frac{28}{52} = \frac{7}{13}$$

red 10's red 10's

Sep 10-11:59 AM

Example

In a survey, 15% of respondents said that their favorite type of music is classical, and 37% like rap. If a person is selected at random, find the probability that his or her favorite music is classical or rap.

Exclusive

$$15\% + 37\% = 52\%$$

C R

Sep 10-12:04 PM

Example

In a hospital unit there are 8 nurses and 5 physicians; 2 nurses and 3 physicians are males. If a staff person is selected, find the probability that the subject is a nurse or a male.

NE

$$\frac{8}{13} + \frac{5}{13} - \frac{2}{13} = \frac{11}{13}$$

total male nurses

Feb 25-10:32 AM

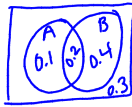
Example

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

The probability of event A=0.3. The probability of B= 0.6 and the probability of $A \cap B = 0.2$

a.) Draw a venn diagram to represent the info.

b.) Find the probability of $A \cup B$



$A \cup B$
 $A \text{ or } B = 0.3 + 0.6 - 0.2$

0.7

Sep 19-9:50 AM

Example

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

The probability of event A=0.51. The probability of B= 0.40 and the probability of $A \cap B = 0.91$

a.) Find the probability of $A \cap B = 0$

b.) Are A and B mutually exclusive?
 yes $A \cap B = 0$

Jan 23-9:01 AM

Example

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

Events A and B are mutually exclusive with $P(A)=0.42$ and $P(A \text{ or } B)=0.75$.

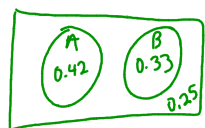
Find

a.) $P(B) = 0.33$

b.) $P(\text{not } A) = 0.58$

c.) $P(A \text{ and } B) = 0$

$0.75 - 0.42$



Sep 10-12:19 PM

Example

A survey of 100 seniors where checked off if they were taking AP English or AP Biology

34 seniors are not in either AP English or AP Biology

5 seniors are taking both AP English and AP Biology and

44 seniors are taking AP English

a) Create a Venn Diagram to represent the data, and fill in the counts for each region.

What is the probability that a student is taking....

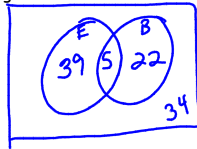
b) AP English? $\frac{44}{100} = \frac{11}{25}$

c) AP Biology? $\frac{27}{100}$

d) AP Biology or AP English? $\frac{39+5+22}{100} = \frac{66}{100} = \frac{33}{50}$

e) AP Biology and AP English? $\frac{5}{100} = \frac{1}{20}$

f) AP Biology but not AP English? $\frac{22}{100} = \frac{11}{50}$



Why can't I just add the students taking AP English and the students taking AP Biology to figure out "How many students are taking AP English or AP Biology?"

Jan 24-7:08 AM

Example

In a recent survey, the following data was obtained in the response to the question "Do you prefer getting the news from a newspaper?"

	YES	NO	NO OPINION	
under 50	21	45	4	→ 70
50 and over	32	11	7	→ 50
	53	56	11	120

If a person is selected at random, find the probability that the person

a.) has no opinion $\frac{11}{120}$

b.) is under 50 and doesn't get the news from a newspaper. $\frac{45}{120}$

c.) is under 50 or doesn't get the news from a newspaper.

$\frac{20}{120} + \frac{56}{120} - \frac{45}{120} = \frac{81}{120}$

Sep 10-12:10 PM

Assignment:

Unit Plan Day 2

Unit 2 Quiz

Thursday 9/12

Sep 10-12:25 PM