Learning Goal: Mutually Exclusive and Non-Mutually Exclusive Events
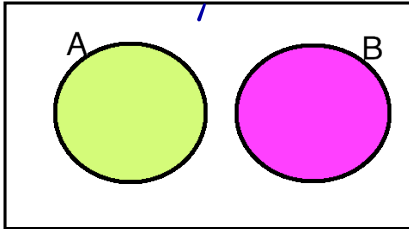
Mutually Exclusive Events (Disjoint)	Non-Mutually Exclusive Events
- events that cannot occur simultaneously	- events that can occur simultaneously
Ex. A=alive B=dead	Ex. A=eating B=watching TV
Ex. A=standing up B=sitting down	Ex. A=texting B=talking
Ex. A=driving B=walking	Ex. A=listening to music B=doing homework
$P(A \text{ or } B) = P(A) + P(B)$	$P(A \text{ or } B) = P(A) + P(B) - P(A \cap B)$
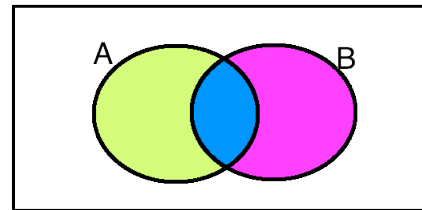
Homework Question #1 from Textbook Page 340

Classify each pair of events as mutually exclusive or non-mutually exclusive:

	Event A	Event B	Mutually Exclusive (ME) Or Non-Mutually Exclusive (NON)
a)	Randomly drawing a grey sock from a drawer	Randomly drawing a wool sock from a drawer	Non-mutual
b)	Randomly selecting a student with brown eyes	Randomly selecting a student on the honour roll	Non-mutual
c)	Having an even number of students in your class	Having an odd number of students in your class	mutually-ex
d)	Rolling a six with a die	Rolling a prime number with a die	mutually-ex
e)	Your birthday falling on a Saturday next year	Your birthday falling on a weekend next year	non-mutual
f)	Getting an A on the next test	Passing the next test	non-mutual
g)	Calm weather at noon tomorrow	Stormy weather at noon tomorrow	mutually-ex
h)	Sunny weather next week	Rainy weather next week	non-mutually

Textbook Page 337 Example#1:

Teri attends a fundraiser at which 15 T-shirts are being given away as door prizes. Door prize winners are randomly given a shirt from a stock of 2 black shirts, 4 blue shirts, and 9 white shirts. Teri really likes the black and blue shirts, but is not too keen on the white ones. Assuming that Teri wins the first door prize, what is the probability that she will get a shirt that she likes?

Mutually Exclusive or Non-Mutually Exclusive?

$$P(Black) = \frac{2}{15}$$

$$P(Blue) = \frac{4}{15}$$

$$P(Black \; OR \; Blue) = \frac{2}{15} + \frac{4}{15}$$

$$= \frac{6}{15}$$

$$= \frac{2}{5}$$

Textbook Page 338 Example#2:

A card is randomly selected from a standard deck of cards. What is the probability that either a heart or a face card (Jack, Queen, King) is selected?

Mutually Exclusive or Non-Mutually Exclusive?

$$P(heart) = \frac{13}{52} \qquad P(face) = \frac{12}{52} \qquad P(heart \cap face) = \frac{3}{52}$$

$$P(heart \; or \; face) = \frac{13 + 12 - 3}{52}$$

$$= \frac{11}{26}$$

Example #3:

There are a red, white, blue, green and orange marbles. What is the probability that either white and blue be the first two or orange would be last?

Mutually Exclusive or Non-Mutually Exclusive?

$$P(white \& blue \; be \; the \; 1^{st} \; two) + P(orange \; last) - P(w \& b \; 1^{st} \; two \cap orange \; last)$$

$$= \frac{(2!) \times (3!)}{5!} + = \frac{4! \times 1!}{5!} - = \frac{2! \times 2! \times 1}{5!}$$

$$= \frac{32}{120}$$

$$= \frac{4}{15}$$

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