N	ame
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Math 130 Day 5 Lecture Worksheet
Probabilities of ORs / Conditional Probabilities

Compound Events and Their Probabilities: Probabilities of ORs

Ex 3: Experiment Roll a single die once Events A = The die lands on an even number B = The die lands on a multiple of 3 C = The die lands on a prime number D = The die lands on 4 E = The die lands on a number bigger than 2 Find $P(A \cup E), P(B \cup D)$

<u>Ex 4:</u>

Experiment

Draw a single card from a standard poker deck Events

A = Draw a heart

B = Draw a black card

C = Draw a red face card

D = Draw a king

E = Draw a card that has a number on it that is less than 5

Find

 $D \cup E$, $P(D \cup E)$

Ex 5:

Experiment

Play a single game of roulette **Events**

A = The ball lands in an odd slot

B = The ball lands in a red slot

C = The ball lands in a green slot

D = The ball lands on a number that is a multiple of 3

E = The ball lands in a slot that is part of the 1st 12 bet F = The ball lands in a slot that is part of the 3rd 12 bet and is a black number

G = The ball lands on a number that is part of the 2nd column Find

 $P(A \cup B), P(C \cup E)$

<u>Ex 6:</u> A blood bank catalogs the types of blood, including positive or negative Rh-factor, given by donors during the last five days. The number of donors who gave each blood type is shown in the table. A donor is selected at random.

a) Find the probability that the donor has type O or type A blood.

b) Find the probability that the donor has type B blood or is Rh-negative.

		Blood Type				
		Ο	А	В	AB	Total
	Positive	156	139	37	12	344
Rh-						
factor	Negative	28	25	8	4	65
	Total	184	164	45	16	409

<u>Ex 7:</u> The probability that a randomly selected person in the world will have brown eyes is 53%, the probability they will have blue eyes is 18%, the probability they will have green eyes is 16%, the probability they will be left handed is 10% and the probability that they will have blue eyes and be left handed is 2%.

a) What is the probability that a randomly selected person in the world will have brown eyes or green eyes?

b) What is the probability that a randomly selected person in the world will have blue eyes or be left handed?c) What is the probability that a randomly selected person in the world will have brown eyes, blue eyes, or green eyes?

Compound Events and Their Probabilities: Conditional Probabilities

Ex 8 (or Ex 4):

Experiment

Draw a single ball from the bag \rightarrow Events

- A = You draw a ball with an even number on it
- B = You draw a ball with a prime number on it
- C = You draw a yellow ball
- D = You draw a ball that is both blue and even
- E = You draw a ball with a number larger than 6 on it
- F = You draw a ball that is both less than 7 and odd

Find

P(A|B), P(B|A), P(C|F), P(A|E)

Question: Are the events A and C independent? How about the events B and E?



Ex 5: Experiment Draw 2 balls from the bag one by one with replacement Events R_i = The *i*th ball drawn is red Y_i = The *i*th ball drawn is yellow B_i = The *i*th ball drawn is blue G_i = The *i*th ball drawn is green E_i = The *i*th ball drawn is even O_i = The *i*th ball drawn is odd Find $P(R_2|R_1)$, $P(G_2|B_1)$





<u>Ex 6:</u>

Experiment

Draw 2 balls from the bag one by one without replacement Events

 R_i = The *i*th ball drawn is red Y_i = The *i*th ball drawn is yellow B_i = The *i*th ball drawn is blue G_i = The *i*th ball drawn is green E_i = The *i*th ball drawn is even O_i = The *i*th ball drawn is odd

Find

 $P(R_2|R_1)$, $P(G_2|B_1)$, $P(B_2|B_1)$, $P(R_2|Y_1)$



<u>Ex 7:</u>

Experiment

Draw a single card from a standard poker deck

Events

A =Draw a heart

B = Draw a black card

C = Draw a red face card

D = Draw a king

E = Draw a card that has a number on it that is less than 5

Find

P(C|A), P(B|D), P(D|C)

Question:

Are the events A and D independent?

 $\underline{\text{Ex 8:}}$ A detective is trying to solve a murder case. At the outset of his investigation he knows that the murderer is one of the 200 people in the following table.

		City of Residence				
	Murder Suspects	Montebello	Pico Rivera	Total		
Gender	Male	105	35	140		
	Female	45	15	60		
	Total	150	50	200		

Questions:

a) What is the probability that at the outset of the investigation the murdered is female?

b) Suppose that after further narrowing down the suspects, the investigator has determined that the murderer lives in Pico Rivera. Now what is the probability that the murderer is female?

c) Are the events "murderer is female" and murderer lives in Pico Rivera independent?