Thursday, May 2, 2019

- Warm-up
- Notes
- Practice

$P(J) = \frac{80}{150}$

$P(DL) = \frac{115}{150}$

$P(J \mid DL) = \frac{60}{115}$

$P(DL \mid J) = \frac{60}{80}$

Consider the table below, which shows how many juniors and seniors at a small high school have a driver's license.

	Juniors	Seniors	Total
Have Driver's License	60	55	115
Do Not Have License	20	15	35
Total	80	70	150

Suppose you pick a student at random.

a. Find *P*(*junior*), *P*(*has driver's license*), *P*(*junior* | *has driver's license*), and *P*(*has driver's license* | *junior*).

only look @ that part of the table

Objectives

Content: I will define **independence** and **mutually exclusive** and apply these ideas to other questions.

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Independence

	Juniors	Seniors	Total
Have Driver's License	60	55	115
Do Not Have License	20	15	35
Total	80	70	150

Concept

Other actions (events) do not effect you

cards with replacement

Dice rolls

spinners

coin flips

marbles with "replacement"

One event occuring does not effect the chances of the other occuring

Calculation

$P(A) = P(A|B)$

is =

is independent

$P(\text{Spade}) = \frac{13}{52}$

$P(\text{Spade}|\text{Spade}) = \frac{12}{51}$

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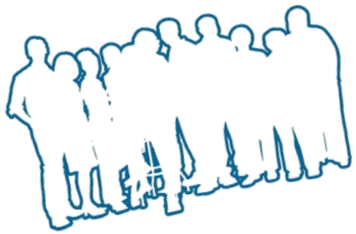
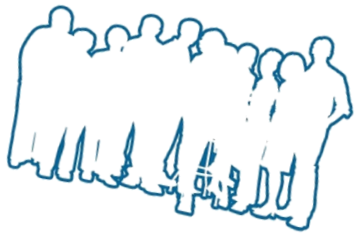



Mutually Exclusive

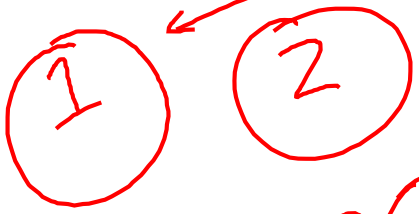
	Juniors	Seniors	Total
Have Driver's License	60	55	115
Do Not Have License	20	15	35
Total	80	70	150

Concept

"no cross-over"

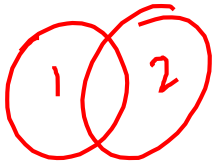
no "overlap"

Venn Diagram ⇄ mutually Exclusive



→ P(A and B) = 0

Not mutually Exclusive



Even and Prime is overlap of 2 not M.E.

King and Queen

♡ and black

P(J AND DL) = 60/150

not mutually exclusive NOT zero

Calculation

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A survey of 505 teens by the American Academy of Dermatology included 254 boys and 251 girls. Thirty-three percent of the boys said they wear sunscreen, and 53% of the girls said they wear sunscreen.

254 * 0.33

a. Fill in a copy of the following table, showing the number of teenagers who fell into each category.

	Boy	Girl	Total
Wear Sunscreen	84	133	217
Don't Wear Sunscreen	170	118	288
Total	254	251	505

Source: www.aad.org/public/News/NewsReleases/Press+Release+Archives/Skin+Cancer+and+Sun+Safety/Teen+Survey+Results.htm

1. P(sunscreen) = $\frac{217}{505}$
2. P(boy) = $\frac{254}{505}$
3. P(sunscreen AND boy) = $\frac{84}{505}$
4. P(sunscreen OR boy) = $\frac{387}{505}$
5. P(sunscreen | boy) = $\frac{84}{254}$
6. Are wearing sunscreen & being a boy mutually exclusive? P(S AND B) =
7. Are wearing sunscreen & being a boy independent?

P(S) = P(S|B)

$\frac{217}{505} \stackrel{?}{=} \frac{84}{254}$

0.429 0.295

If = yes Independence: yes

Not mutually exclusive b/c AND ≠ 0

NO

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Brain Break

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Review

Left handed and female

		Dominant Hand		
		Left	Right	Total
Gender	Female	11	104	115
	Male	24	92	116
	Total	35	196	231

- According to this data, ar
events left handed and fe
mutually exclusive? Prov

$P(LH \text{ AND } F) \neq 0$

not mutually exclusive

$P(F \text{ or } LH)$

$P(F) + P(LH) - P(F \text{ AND } LH)$ overlap

$\frac{115}{231} + \frac{35}{231} - 0.15$ $\quad 0.095$

$\frac{35}{231} \stackrel{?}{=} \frac{11}{115}$ NO

- According to this data, are the events left handed and female independent? Prove it…

$P(F) \stackrel{?}{=} P(F \mid LH)$

$P(LH) \stackrel{?}{=} P(LH \mid F)$

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More with Mutually Exclusive & Independent

Cards with replacement:

P(Queen OR King) =

P(Queen AND King) =

P(Queen, King) =

Cards without replacement:

P(Queen OR King) =

P(Queen AND King) =

P(Queen, King) =

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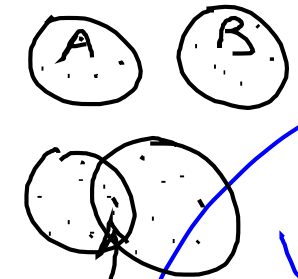
$P(A \text{ OR } B) = P(A) + P(B) - P(A \text{ AND } B)$

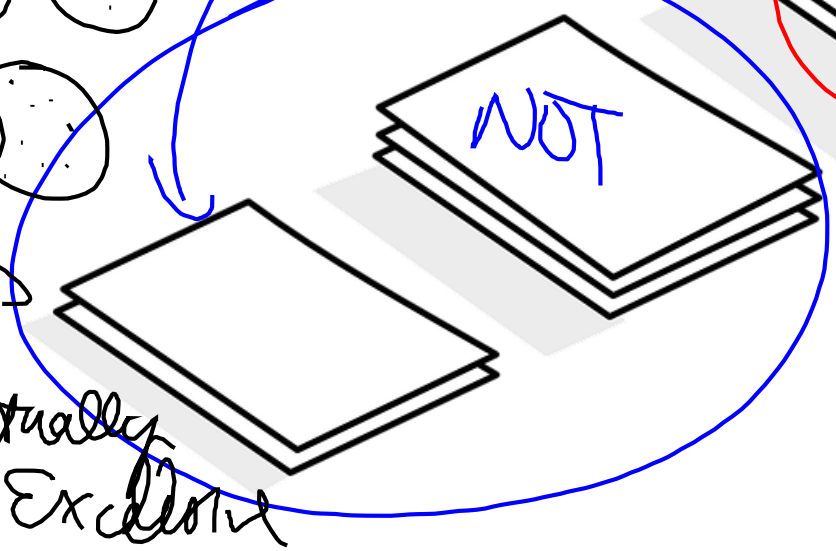
Event Sort

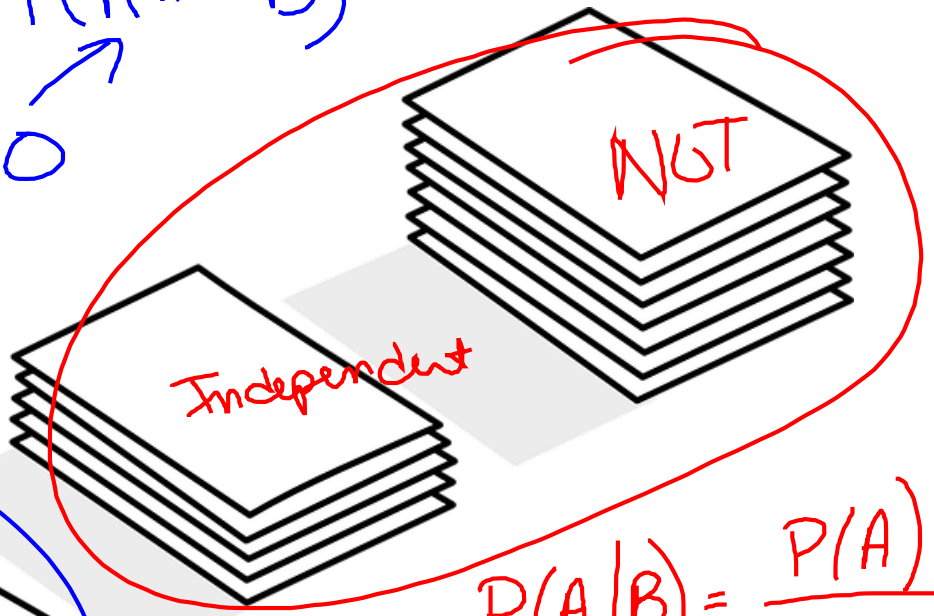
if 0

Mutually Exclusive



AND not Mutually Exclusive





$$P(A|B) = \frac{P(A)}{P(A \text{ and } B)}$$

$P(A) = P(A|B)$ is independent

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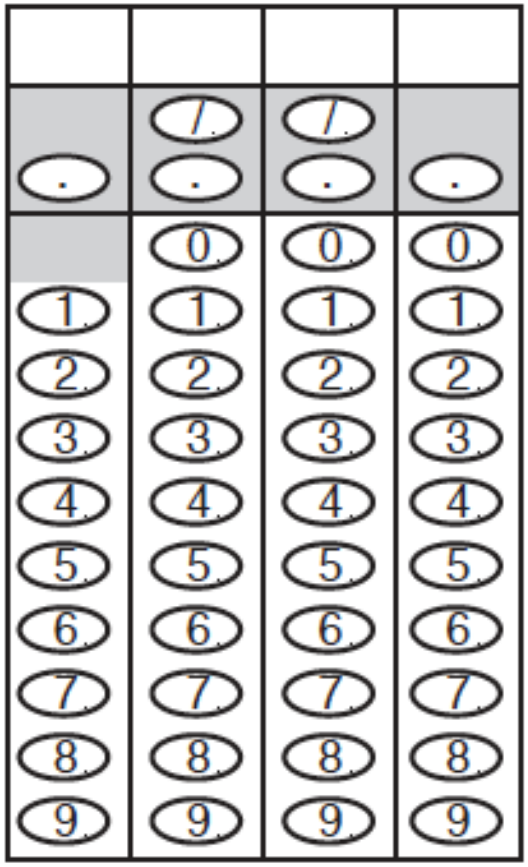
Exit Slip

Grid-In:

A die is rolled four times. What is the probability of getting a number greater than '2' in the first time, greater than '3' in the second time, greater than '4' in the third time, and greater than '5' in the fourth time? [With calculator]



Show your process for full credit

Think through each individual probability, then put it together through multiplication

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