Tuesday, April 23, 2019

$P(J \cap DL) = \frac{60}{150}$

$P(J \cup DL) = \frac{80}{150} + \frac{115}{150} - \frac{60}{150}$

$= \frac{60}{150} + \frac{20}{150} + \frac{55}{150}$

- 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)*.

Objectives

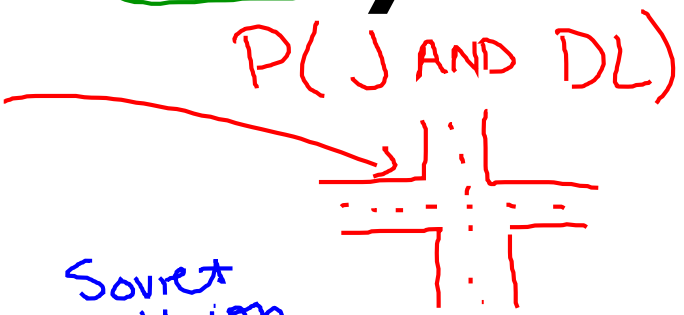
Content: I will define **independence** and **mutually exclusive** and apply these ideas to other questions.

Social: I will use my time wisely to work and figure things out.

Language: I will write clear definitions of **independence** and **mutually exclusive** that make sense to me.

Formal Notes – Using a 2 way table

- AND → ∩ (intersection)
  Both criteria are true
- OR → ∪ (union)
  Any of the criteria are met
- Given (conditional probability)
  Only using the part of the table that meets the condition
  P(A | B)
  "given"



Soviet Union → collection of all credit workers

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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

by yourself
not affected by another

If replacement
Independent
- marbles
- cards
- Dice
- Spinner
- Coin Flip

If not replacement
Marbles, Cards → not independent

Being a Jr and having a DL are not independent

Calculation

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

If true → independent

$P(J) \stackrel{?}{=} P(J|DL)$

$\frac{80}{150} \stackrel{?}{=} \frac{60}{115}$

$0.5\overline{3} \neq 0.522$

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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

Not connected to "anyone else"

Can't happen at the same time

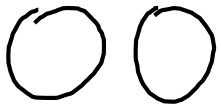
Disjoint

CARDS

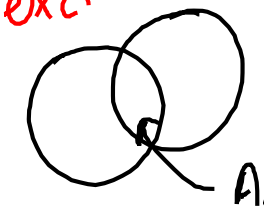
A and ♡ not mutually Exclusive

A and 4 -> is mutually exclusive

Venn Diagrams ->



mutually exclusive



AND: not mutually exclusive

Calculation

$P(A \text{ AND } B) = 0$

"no overlap"

$P(J \text{ AND } DL) = \frac{60}{150}$

not Zero

not mutually exclusive

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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? no -> there are overlap
7. Are wearing sunscreen & being a boy independent? no

$\frac{254}{505} \neq \frac{84}{254}$

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