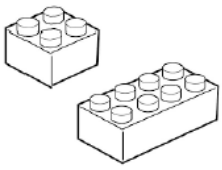
MUTUALLY EXCLUSIVE EVENTS: Two events are mutually exclusive if they can not both happen. (We called this DISJOINT with sets). **P(E∩ F)= P(E *AND* F)=0**

When rolling two dice, the events of "getting a sum of 7", "getting a double" are mutually exclusive because they can not both happen when rolling two dice

P(getting a sum of 7∩ getting a double**)= P(**getting a sum of 7 *AND* getting a double**)=0**

EXAMPLE 7: A box of 25 Lego blocks contains:



2 yellow square blocks
4 blue square blocks
4 green square blocks
3 yellow rectangular blocks
8 blue rectangular blocks
4 green rectangular blocks

Y: yellow
B: blue
G: green
S: square
R: rectangle

A child randomly selects one block at random.

Find P(B), P(S), P(B∩ S), P(B ∪ S) , P((B∩ S)^C)

EXAMPLE 8: ADDITION RULE

In a certain town: 70% of households have Cable TV (*event C*)
55% of households have Netflix (*event N*)
These figures include the fact that 42% of households subscribe to both.

Find the probability that a person subscribes to Cable TV **or** Netflix

OPTIONAL EXAMPLE 9: SEE SECTION 8.2 IN TEXTBOOK IF NOT DONE IN CLASS

Mr. Washington is seeking a community college instructor position. His employment depends on two conditions – whether the board approves the position and whether the hiring committee selects him.
There is an 80% chance the board will approve the position.
There is a 70% chance that the hiring committee will select him.
There is a 90% chance that at least one of these will happen.
Find the probability that he will be hired.

A contingency table displays data for two variables. This table shows the number of individuals or items in each category. We can use the data in the table to find probabilities.

All probabilities <u>EXCEPT conditional probabilities</u> have the grand total in the denominator

<u>Conditional Probabilities</u>: The condition limits you to a particular row or column in the table. Condition says "IF" we look only at a particular row or column, find the probability
The **denominator will be the total for the row or column** in the table that corresponds to the condition

EXAMPLE 10: A large car dealership examined a sample of vehicles sold or leased in the past year. Data is classified by type (**car, SUV, van, truck**) and by whether they were a sale of a **new** or **used** vehicle or whether the vehicle was **leased**.

	Car (C)	SUV (S)	Van (V)	Truck(T)	Total
New vehicle sale (N)	86	25	21	38	170
Used vehicle sale (U)	39	13	4	22	78
Vehicle Lease (L)	34	12	6	0	52
Total	159	50	31	60	300

Suppose a vehicle in the sample is randomly selected to review its sales or lease papers.

a. Find the probability that the vehicle was leased.

b. Find the probability that a vehicle is a truck.

c. Find the probability that a vehicle is NOT a truck.

d. Find the probability that the vehicle was a car AND was leased.

e. Find the probability that a vehicle was used IF (*given that*) it was a van.

f. Find the probability that the vehicle was a van IF (*given that*) it was used.

Mutually Exclusive Events: P(E and F) = 0 $P(E \cap F) = 0$

i. Are events T, L mutually exclusive?

j. Are events N, V mutually exclusive?