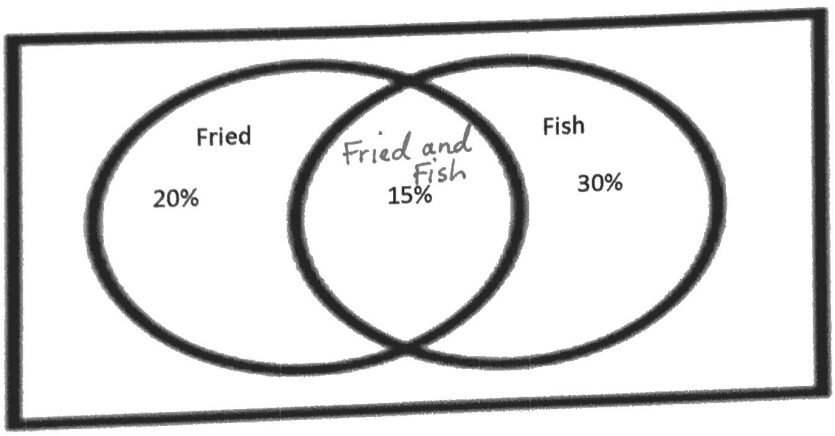
After being open for six months, Freddy realized he was having more food waste than he should because he was not predicting how much of each he should prepare in advance. His business friend, Tyrell, said he could help.

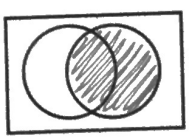
2. What information do you think Tyrell would need?

Luckily, Freddy uses a computer to take orders each day so Tyrell had lots of data to pull from. After determining the average number of customers Freddy serves each day, Tyrell created the following Venn diagram to show Freddy the food preference of his customers:

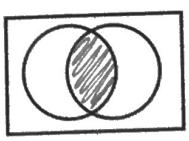



To make sense of the diagram, Freddy computed the following probability statements:

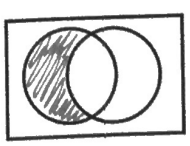
3. What is the probability that a randomly selected customer would order fish?
   P(fish) = 45%
   Shade the part of the diagram that models this solution.



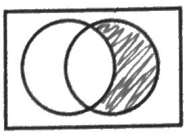
4. What is the probability that a randomly selected customer would order fried fish? "and"
   P(fried ∩ fish) = P(fried and fish) = 15%
   Shade the part of the diagram that models this solution.



5. What is the probability that a person prefers fried chicken?
   P(fried∩chicken) = P(fried and chicken) = 20%
   Shade the part of the diagram that models this solution.

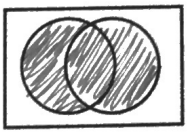


6. What is the estimated probability that a randomly selected customer would want their fish grilled?
   P(grilled and fish) = P(grilled ∩ fish) = 30%
   Shade the part of the diagram that models this solution.

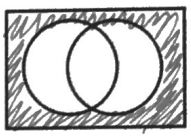


7. If Freddy serves 100 meals at lunch on a particular day, how many orders of fish should he prepare with his famous fried recipe? 15/100
   P(fish ∩ fried) = 15%

8. What is the probability that a randomly selected person would choose fish or fried? "or"
   P(fried∪fish) = P(fried or fish) = 65%
   Shade the part of the diagram that models this solution.



9. What is the probability that a randomly selected person would NOT choose fish or fried?
   Shade the part of the diagram that models this solution.
   P(not fish ∪ fried) = 100 − P(fish ∪ fried) = 35%



Yesterday we defined independent and dependent events.

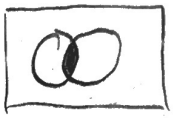
## MUTUALLY EXCLUSIVE (DISJOINT) EVENTS

events that <u>cannot</u> occur at the same time


## INCLUSIVE (JOINT) EVENTS

events that <u>can</u> happen simultaneously

## INTERSECTIONS ("AND")



Notation: $P(A \cap B)$

→ When events are independent, $P(A \cap B) = P(A) \cdot P(B)$

→ When dependent, $P(A \cap B) = P(A) \cdot P(B|A)$

→ If mutually exclusive, $P(A \cap B) = 0$

## UNIONS ("OR")

Notation: $P(A \cup B)$ * <u>U</u> for Union

→ When events are mutually exclusive, add probabilities

$P(A \cup B) = P(A) + P(B)$

→ When events are joint,

$P(A \cup B) = P(A) + P(B) - P(A \text{ and } B)$