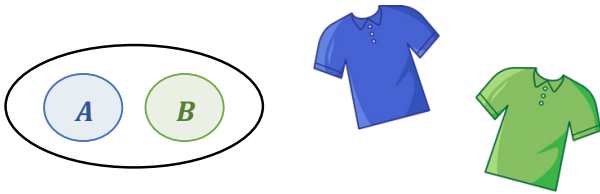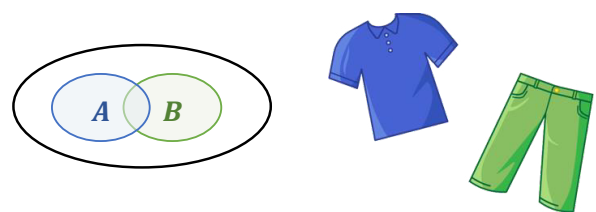# TOPIC: ADDITION RULE
Probability of Mutually Exclusive Events

◆ Events which CANNOT happen at the same time are mutually exclusive.

Mutually Exclusive Events	NOT Mutually Exclusive

EXAMPLE   Identify whether each set of events is mutually exclusive or not.

(A) Getting heads when flipping a coin vs getting tails

(B) Getting a 6 when rolling a die vs getting a number higher than 3

Events **[ARE | ARE *NOT*]** mutually exclusive

Events **[ARE | ARE *NOT*]** mutually exclusive

◆ To find the probability of any one of multiple mutually exclusive events occurring, _____ the probability of each.

▸ $A \cup B$ means any event in A **OR** B New

$$P(A \cup B) = \underline{\hspace{3cm}}$$

EXAMPLE   You roll a six-sided die. What is the probability of getting a 3 **OR** a 5?

Recall

$$P(event) = \frac{\# \ of \ outcomes \ with \ event}{\# \ of \ TOTAL \ outcomes}$$

PRACTICE   If a single card is randomly selected from a deck of cards, what is the probability of selecting an ace or a king?
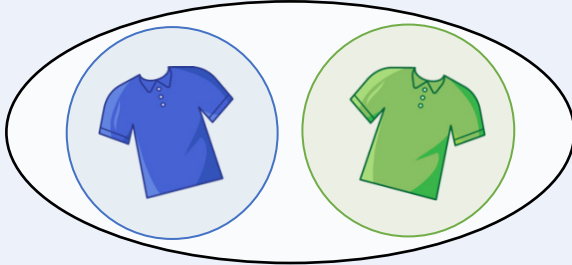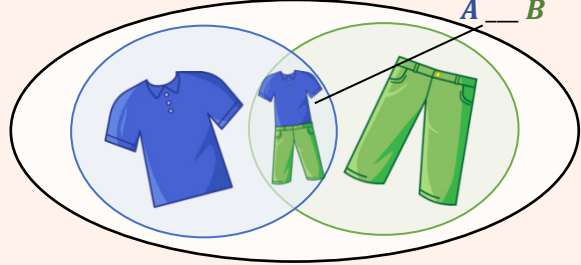
PRACTICE   For two mutually exclusive events A and B, compute $P(A \cup B)$ if $P(A) = 0.15$ and $P(B) = 0.32$
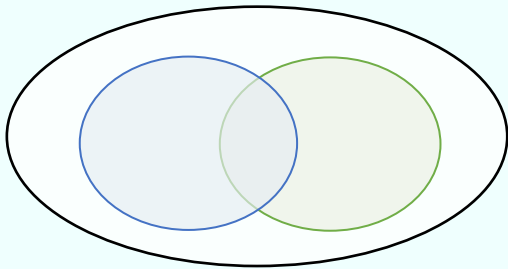
TOPIC: ADDITION RULE

Probability of Non-Mutually Exclusive Events

◆ For events which are **NOT** mutually exclusive, there is overlap in which both events can occur at the same time.

  ▸ We must subtract the probability of the _____, so it doesn't get counted twice.

Recall ▶ **Mutually Exclusive**	New ▶ **NOT Mutually Exclusive**
$P(A \cup B) = P(A) + P(B)$	A ___ B $P(A \cup B) = P(A) + P(B) -$ _____ *"or"* *"and"*

EXAMPLE   When rolling a six-sided die, what is the probability of rolling a number greater than 3 **OR** an even number?

Rolling a Six-Sided Die

$$P(\text{\_\_\_\_\_} \cup \text{_____}) = \quad + \quad -$$

◆ The equation for $P(A \cup B)$ is the same for *all* events, but for mutually exclusive events, $P(A \cap B)$ is always ___.

TOPIC: ADDITION RULE

The table below shows the outfits of 300 observed people on a given day. Of one person randomly selected from this group, what is the probability that they will be wearing shorts or a green shirt?

	Wearing a red shirt	Wearing a red shirt	Wearing a green shirt	Total
Wearing Pants	68	27	17	112
Wearing Shorts	63	36	89	188
Total	131	63	106	300

A card is drawn from a standard deck of 52 cards. What is the probability that the card is a diamond or a king?