Dependent Events When the outcome of one event affects the outcome of a second event.

Independent Events When the outcome of one event does NOT affect the outcome of a second event.

xample 1) Classify and explain each set of events as pendent or independent: Roll a number cube. Then toss a coin. Independent Spinning a 4 and then a 4 again on a spinner. Independent Selecting two Aces from a deck of cards when the 1st one not replaced. Dependent	Your Turn 1) Classify and explain each set of events a dependent or independent: *Selecting two Aces from a deck of cards when the 1st is replaced. Independent *Flipping a coin twice and it is heads both times. Independent *Select a marble from a bag that contains marbles of 2 colors. Put the marble aside ands then select another marble. dependent

Probability of A and B given the two events are independent:

Multiply $P(A) \cdot P(B)$

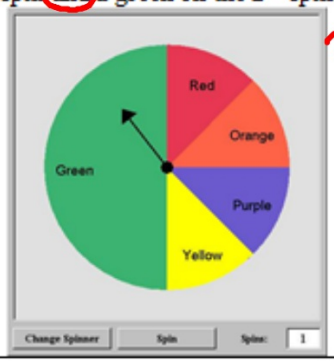
Example 1) If $P(A) = \frac{3}{4}$ and $P(B) = \frac{1}{3}$ then

$P(A \text{ and } B) = \frac{3}{4} \cdot \frac{1}{3} = \frac{3}{12} = \boxed{\frac{1}{4}}$

Your Turn 1) If $P(A) = \frac{1}{4}$ and $P(B) = \frac{2}{5}$ then

$P(A \text{ and } B) = \frac{1}{4} \cdot \frac{2}{5} = \frac{2}{20} = \boxed{\frac{1}{10}}$

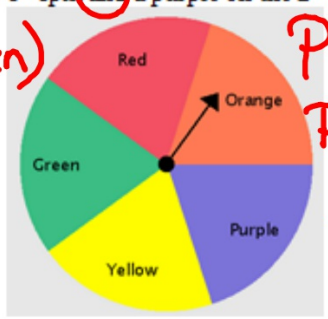
Example 2) Find the probability of getting a red on the 1st spin and a green on the 2nd spin.



Independent

$P(\text{Red and Green}) = \frac{1}{8} \cdot \frac{1}{2} = \boxed{\frac{1}{16}}$

Your Turn 2) Find the probability of getting a green on the 1st spin and a purple on the 2nd spin.



Independent

$P(\text{Green and Purple}) = P(G) \cdot P(P) = \frac{1}{5} \cdot \frac{1}{5} = \boxed{\frac{1}{25}}$

Mutually Exclusive (M.E): Two events that cannot occur at the same time.

Not Mutually Exclusive (N.M.E): Two events that can happen at the same time.

Probability of A or B

Mutually Exclusive: $P(A \text{ or } B) = P(A) + P(B)$

Not Mutually Exclusive: $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B$

$P(2 \text{ or Even})$

$P(2) + P(\text{Even}) - P(2 \text{ and Even}$

$\frac{1}{6} + \frac{3}{6} - \frac{1}{6} = \frac{1}{2}$

Example 3) A drink company applies one label to each bottle cap: "free drink", "free meal" or "try again". A bottle c
has a $\frac{1}{10}$ probability of being labeled "free drink", a $\frac{1}{25}$ probability of being labeled "free meal", and a $\frac{43}{50}$ probabi
of being labeled "try again".

a) Are the events free drink and free meal mutually exclusive and why? Mutually Excl

because they cannot happen at the same t

b) What is the probability that a bottle cap is labeled free drink or free meal?

$P(FD \text{ OR } FM) = \frac{1}{10}\cdot\frac{5}{5} + \frac{1}{25}\cdot\frac{2}{2}$

$\frac{5}{50} + \frac{2}{50} = \boxed{\frac{7}{50}}$

Your Turn 3)

a) Are the events free drink and try again mutually exclusive and why? Mutuall

Exclusive $\Rightarrow$ can't happen at same time

b) What is the probability that a bottle cap is labeled free drink or free try again?

$P(FD \text{ or } TA) \frac{5}{5}\cdot\frac{1}{10} + \frac{43}{50}$

$\frac{5}{50} + \frac{43}{50} = \frac{48}{50} = \frac{24}{25}$

Example 4) For the set of events state whether they are mutually exclusive and then find the probability.

Rolling a 5 or an odd on a # cube: Not mutually Exclusive.

$P(5) = \frac{1}{6}$

$P(\text{odd}) = \frac{3}{6}$

Your Turn 4) For the set of events state whether they are mutually exclusive and then find the probability.

Rolling a prime or an odd on a # cube: Not mutually Exclusive

P(P) 1, 2, 3, 5 + P(ODD) ~~1, 3, 5~~ $\frac{4}{6}$

$\boxed{\frac{2}{3}}$

$P(5)$ + $P(\text{ODD})$ Rolling 5 ~~1, 3, 5~~ $= \frac{3}{6} = \frac{1}{2}$