4.22.15

. What is the difference between theoretical and experimental probability?

Theoretical: Calculating using math formulas.

Experimental: Using an active experiment to determine probabilit

. What is the difference between a permutation and a combination?

Combination: Order does not matter.

Permutation: Order matters.

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 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:

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

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

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

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

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

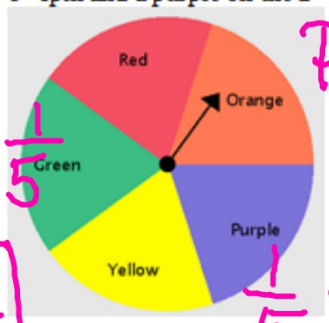
Example 2) Find the probability of getting a red on the 1st spin and a green on the 2nd spin.

$P(R \text{ and } G) = \frac{1}{8} \cdot \frac{1}{2}$

$P(R \text{ and } G) = \frac{1}{16}$

$P(G) = \frac{1}{2}$ $P(R) = \frac{1}{8}$

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



$\frac{1}{5}$ $\frac{1}{5}$

$P(G \text{ and } P) = \frac{1}{5} \cdot \frac{1}{5}$

$P(G \text{ and } P) = \frac{1}{25}$

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

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

Probability of A or B

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

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

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? The events are mutually exclusive because they can't happen at the same time.

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

$P(D)+P(M) \overset{5}{=} \frac{5}{5}\cdot\frac{1}{10}+\frac{1}{25}\cdot\frac{2}{2} \overset{=}{=} \frac{7}{50}$

$\frac{5}{50}+\frac{2}{50}$

Your Turn 3)

a) Are the events free drink and try again mutually exclusive and why? The events are mutually exclusive because they can't happ at the same time.

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

$P(D)+P(T) \overset{5}{=} \frac{5}{5}\cdot\frac{1}{10}+\frac{43}{50}=$

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

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, the can happen at the same time.

$P(5 \text{ or odd}) = \frac{1}{2}$

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:

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

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

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

$P(5) + P(\text{odd}) - P(\text{both})$

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

$\frac{3}{6} = \boxed{\frac{1}{2}}$

$P(5)$ 5

$P(\text{odd})$ 1 3 5

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