Probability of Independent events

Dependent Events are two events where the outcome of one event affects the outcome of the second event

Independent Events are two events where the outcome of one event does not affect the outcome of the second event

Sort into categories.

Independent

1 Jessica rolls a cube numbered 1 - 6 and flips a coin.

2 Chelsea flips a coin twice.

4 from a bag and **replaces** it, then Clarence chooses a marble from the bag.

6 s on two ce from one bunch of flowers and then chooses a tulip from a different bunch.

Dependent

3 Briana chooses a marble from a bag **and keeps it**, then Clarence chooses a marble from the bag.

7 Sue takes a coin from the jar and does not replace it. Then you take a coin form the jar.

Sort into categories.

Independent

1 Jessica rolls a cube numbered 1 - 6 and flips a coin.

2 Chelsea flips a coin twice.

4 Briana chooses a marble from a bag and **replaces** it, then Clarence chooses a marble from the bag.

5 A woman chooses a lily from one bunch of flowers and then chooses a tulip from a different bunch.

6 Jackson guesses on two multiple choice questions.

Dependent

3 Briana chooses a marble from a bag **and keeps it**, then Clarence chooses a marble from the bag.

7 Sue takes a coin from the jar and does not replace it. Then you take a coin form the jar.

Fill in the blanks.

do not

do

Independent Events: The outcome of one event does not affect the probability of the outcome of another event. (or is replaced)

Dependent Events: The outcome of one event does affects the probability of the outcome of another event. (or not replaced)

A spinner has twenty equal-sized sections numbered from 1 to 20. If you spin the spinner, what is the probability that the number you spin will be a multiple of 2 or a multiple of 3?

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20

$$\frac{13}{20} = 65\%$$

A fruit bowl contains 3 red apples, 2 green apples, 2 oranges, 1 lime, and 1 lemon. Suppose you reach into the fruit bowl and select a piece of fruit at random. What is the probability that the piece of fruit is green or citrus?

$$\frac{6}{9} = \frac{2}{3} = 66\tfrac{2}{3}\%$$

A standard number cube is tossed. Find each probability.

1, 2, 3, 4, 5, 6

a) P(4 or even) $\frac{3}{6} = \frac{1}{2} = 50\%$

b) P(odd or greater than 2)

$\frac{5}{6} \approx 83\%$

c) P(even or prime) $\frac{5}{6}$

d) P(greater than 1 or less than 5) $\frac{3}{6} = 50\%$

Probability of A and B

If A and B are independent events, then P(A and B) = P(A)*P(B).

Probability of both events = Probability of first event times Probability of second event

Ouch! Sheila choked under pressure.

Sheila made zero out of two. We can calculate the probability of this event as follows:

Event A	Event B
miss	miss
↓	↓

$$P(.30) \bullet P(.30) = .09$$

This tells us that, *on average*, Sheila will miss both of her free-throw shots *only* 9% of the time. She's still a **superstar**!

You toss a coin then roll a number cube (die). Find the probability of getting heads and then rolling a 6.

1st. do the events affect each other?

Independent

2nd. Find the probability of each separate event happening.

Coin: $\frac{1}{2}$ Die: $\frac{1}{6}$

P(head)=_____ P(6)=_____

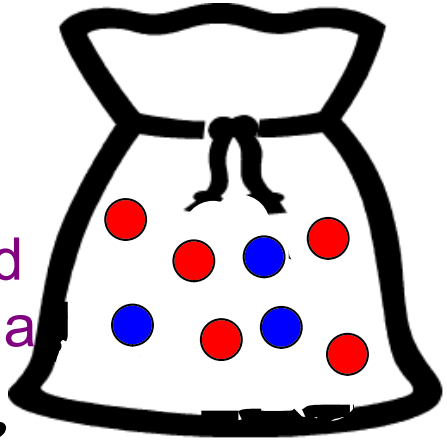
3rd. Multiply them together. P(A and B) = P(A) x P(B)

$\frac{1}{2} \cdot \frac{1}{6} = \frac{1}{12} = 8\frac{1}{3}\%$

A bag contains 3 blue and 5 red marbles.

a. Find the probability of drawing 2 blue marbles in a row with replacing after the first marble is picked.

$\frac{3}{8} \times \frac{3}{8} = \frac{9}{64} \approx 14.1\%$



b. Find the probability of drawing a red marble, replacing it and then drawing a blue marble.

$\frac{5}{8} \times \frac{3}{8} = \frac{15}{64} \approx 23.4\%$

What is the probability of rolling an even number on a number cube and rolling an odd number on a second roll of the same cube?

Answer

1, 2, 3, 4, 5, 6

$\frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4} = 25\%$

A jar contains four blue marbles and two red marbles. Suppose you choose a marble at random, and do not replace it. Then you choose a second marble. Find the probability of each event.

a) You select a red marble and then a blue marble.

$$\frac{2}{6} \cdot \frac{4}{5} = \frac{8}{30} \approx 26.7\%$$

b) Both of the marbles you select are red.

$$\frac{2}{6} \cdot \frac{1}{5} = \frac{2}{30} \approx 6.7\%$$