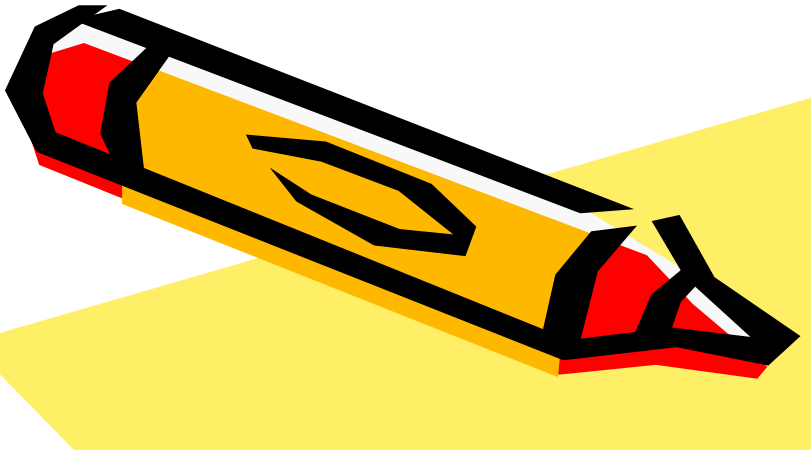
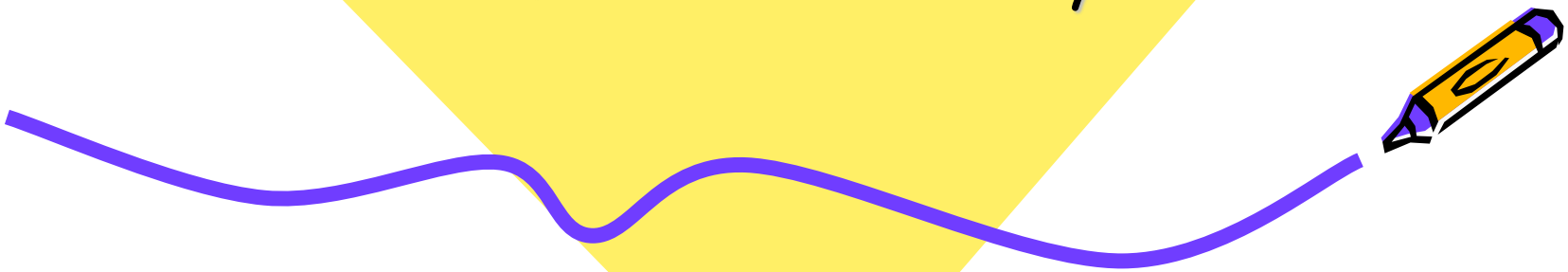


Geometry

Geometric Probability



Geometric Probability

Probability: A numerical value that represents the likeliness of an event occurring. Often expressed as a decimal from 0-1, where 0 means the event definitely will not occur, and 1 means it definitely will. May also be expressed as a fraction or percentage.

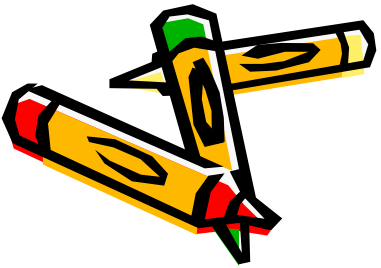
Mathematically, probability is calculated as:

$$p = \frac{\#\ of\ desired\ outcomes}{\#\ of\ total\ possible\ outcomes}$$

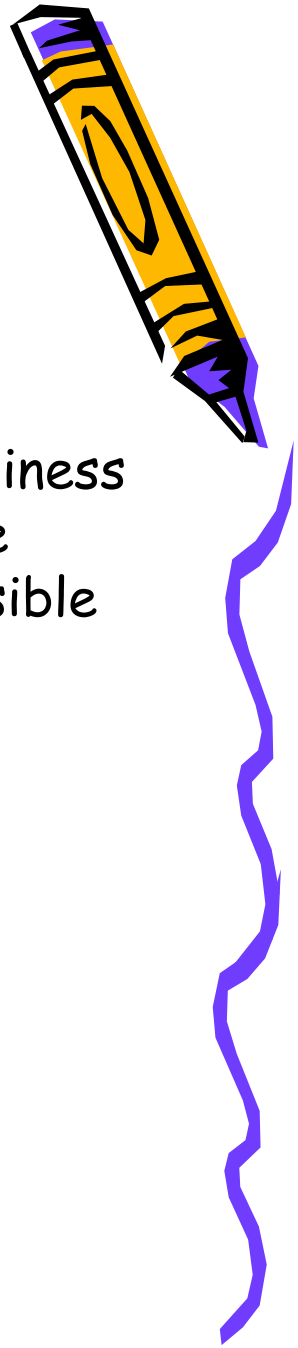
For example: flip a coin and get heads = .5 or 50%

roll die and get a 2 = $\frac{1}{6}$ or 16.7%

select an 8 from a deck of cards = $\frac{4}{52}$ or 7.7%



Geometric Probability

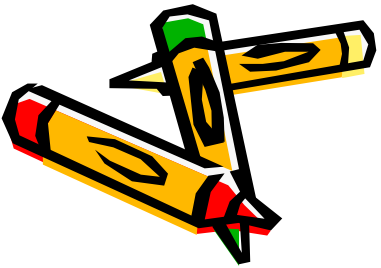


Geometric Probability:

A numerical value that represents the likeliness of an event occurring based on the relative length, time, distance, or areas of the possible outcomes.

Mathematically, geometric probability is calculated as:

$$p = \frac{measurement\ of\ desired\ outcome}{measurement\ of\ total\ possible\ outcome}$$

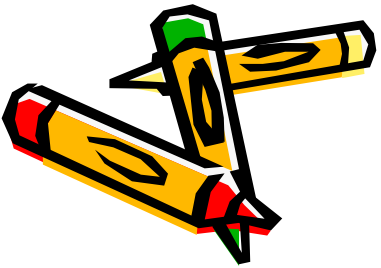


Geometric Probability

Example 1: A radio station will play the song of the day once each hour. To win you must call in when the song is played. If you turn the radio on at 2:35, what is the probability that you have already missed the song during the 2 o'clock hour?

Since there are 60 minutes in a hour, this will represent our measurement of possible outcomes.

Since you turn on the radio at 2:35, 35 minutes have passed where the song might have already been played. This will represent the measurement of desired outcomes (since we are asked for the probability of missing the song).

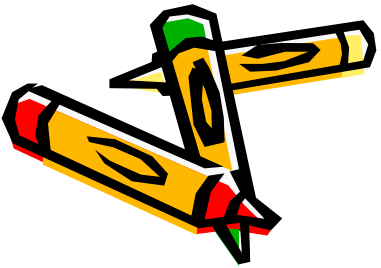


$p = \frac{35}{60}$ = 58% probability that we missed the song.

Geometric Probability

Example 2: In a game of chance participants drop an object onto the game area hoping to randomly strike the desired target. If the game area measures 5′ x 8′ and the target measures 3′ x 3′, what is the probability that a participant will strike the target at random, and therefore win?

$p = \frac{9}{40}$ = 22.5% probability that we will strike the target.



Geometric Probability

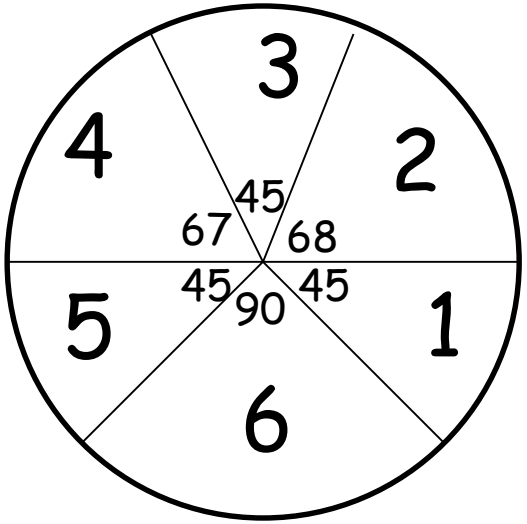
Example 3: Determine the probability of randomly striking the a point in the shaded region.

The area of the shaded region is determined by finding the area of the circle and subtracting the area of the triangle. The geometric probability is determined by diving the area of the shaded region by the overall area (in this case, the circle).

If the area of the shaded region is 30 sq ft, and the area of the circle is 50 sq ft, then the geometric probability of randomly striking the shaded region is 30/50 = .6, or 60%.

Geometric Probability

Example 4: In a game of chance participants spin a wheel hoping it stops on a specific number. However, all numbered sections are of different sizes. The measurement of each section is given in degrees.



What is the probability of the wheel stopping on 2?

Since a circle measures 360^0

$$p = \frac{68}{360} = 18.9\%$$

What is the probability of the wheel stopping on either 2 or 4?

$$p = \frac{68+67}{360} = 37.5\%$$