Name(s)

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Project Number

J1409

Project Title

In Search of Pi

Abstract

Objectives/Goals

The objective to my project is to estimate pi by randomly dropping needles on a flat plane with parallel lines by using the probability that it crosses the line and find the needle length that gets that the quickest

Methods/Materials

MATERIALS

1 Pen

1 large piece of paper

1 Meter stick

40 flat toothpicks (referred to as needles)

Computer with Microsoft Excel

Procedures

1.Hand thrown needle experiment

A.Prepare the experiment

B.Conduct the experiment. For each of the 4 needle lengths, and for N=10 and N=100 drops

2.Computer simulation of random needle throws

A.Generate simulated random needle throw using Microsoft Excel

B.Determine how accurate the estimate of   is for different needle lengths and different numbers of throws.

Results

I found that the needle that is the same length as the distance between the two lines has the most accurate estimate of pi.

Conclusions/Discussion

I concluded that throwing the needle with the same length as the space between lines gets the most accurate estimate of pi and the needle that is 1/4 of the distance between overestimate pi. When I was hand throwing the needles it was as random as I could get it but wasn#t truly random. When I was generating the experiment on the computer there was a equation mishap every once and awhile. When the equation generated a zero crossed the answer of pi is undefined because you cannot divide a number by zero. I took out this data set and replaced it.

Summary Statement

My project is dropping needles manually on a flat plane with parallel lines and by simulating this on the computer and using the probability of them crossing to estimate pi.

Help Received

My dad and my math teacher suggested I do a math science fair project.