

# Tech News

## $\pi$ Day—March 14

March 14 (3/14) is pi day, a celebration of one of the most popular numbers in mathematics. This day was picked to remind people of the decimal expansion for  $\pi$ , which starts with 3.14159265358979323...

Although many of the applications of  $\pi$  are too complicated for elementary school, some of the oldest uses are appropriate. For example, the circumference of a circle is  $\pi$  times its diameter, and the area of a circle is  $\pi$  times the radius squared.

We can make a Scratch program to estimate the value of  $\pi$  using random numbers. We can do this by dropping points uniformly on a square, and seeing how often they land in a particular circle. The fraction of times that they land in the circle is an estimate of the ratio of the area of the circle and the area of the square. This computation is very slow, and is not what mathematicians would use to get good estimates, but it is easy to program in Scratch.

The Scratch website at MIT will probably have a special logo for pi day—check it out tomorrow!

## Einstein's birthday

Albert Einstein was born on 14 March 1879, so tomorrow marks his 129th birthday. He made many important contributions to modern physics, and his name is a familiar name when reporters or advertisers want a famous scientist. His name is sometimes used to mean something difficult to understand (as many find his Theory of Relativity difficult) and sometimes used to mean an intelligent person (like the "Baby Einstein" toys).

### EINSTEIN SIMPLIFIED



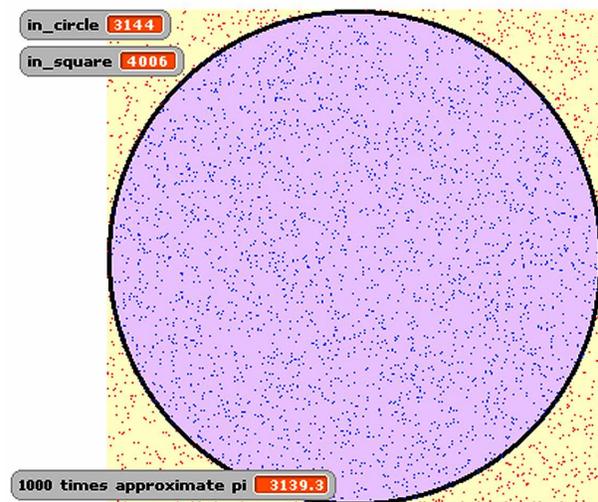
```

when clicked
  set in_circle to 0
  set in_square to 0
  set approximate pi to 3
  clear
  forever
    broadcast dot and wait
  
```

Here is a simple script for dropping points on the screen and counting them to estimate pi. This program illustrates how to move things randomly and how to compute distance from a point (the point at (0,0)).

```

when I receive dot
  change in_square by 1
  go to x: pick random -170 to 170 y: pick random -170 to 170
  if sqrt of x position * x position + y position * y position < 170
    switch to costume blue
    change in_circle by 1
  else
    switch to costume red
  stamp
  set 1000 times approximate pi to 4000 * in_circle / in_square
  
```



This picture is a screenshot after the program to the left has run for a while. As you can see, the error is still quite high, as  $1000 \cdot \pi$  should be 3141.6, not 3139.3. The study of probability and statistics at the college level provides tools for figuring out how good estimates like this can be expected to be.