pi_ByCircle

If a circle of radius R is inscribed inside a square with side length 2R, then the area of the circle will be pi*R^2 and the area of the square will be (2R)^2. So the ratio of the area of the circle to the area of the square will be pi/4.

This means that, if you pick N points at random inside the square, approximately N*pi/4 of those points should fall inside the circle.

Pi is then approximated as follows:

$$pi = \frac{4*M}{N}$$

The example as shown detects where the dart falls by having two sprites one for the square and one for the circle.

Although the Monte Carlo Method is often useful for solving problems in physics and mathematics which cannot be solved by analytical means it is a rather slow method of calculating pi. To calculate each significant digit there will have to be about 10 times as many trials as to calculate the preceding significant digit.

The normal approach would be to picks points at random inside the square. It then check to see if the points, N, are inside the circle (it's inside the circle if x^2 + y^2 < R^2, where x and y are the coordinates of the point and R is the radius of the circle).

To extend this find other ways to find by converging series and plot how quickly they approach pi.