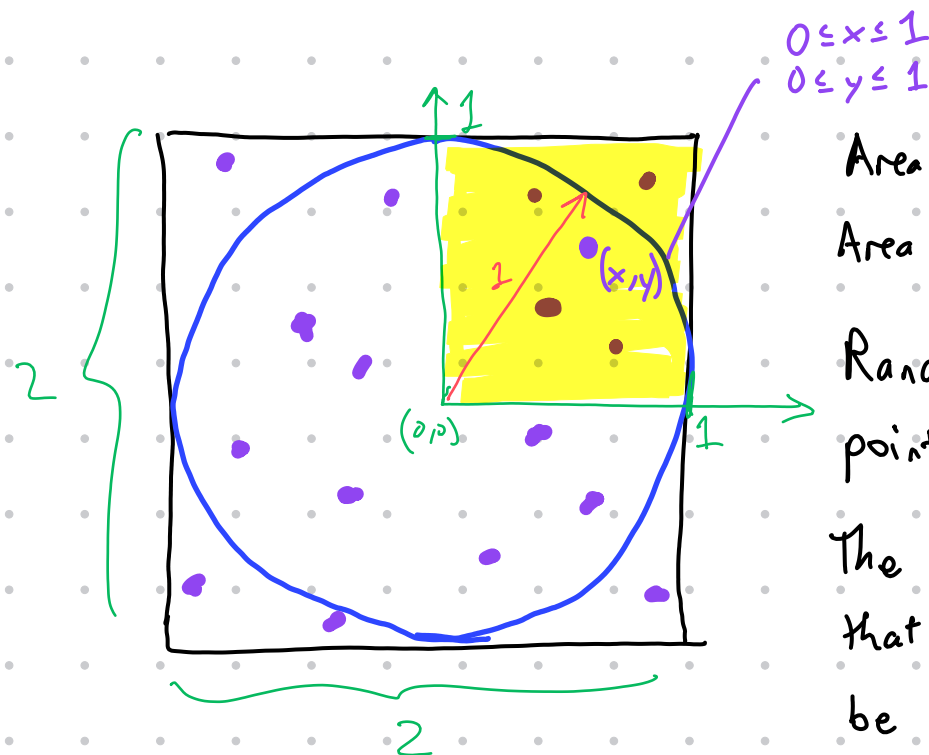


How does the "dart board" algorithm approximate π ?



Area of circle: $\pi(1)^2 = \pi$

Area of square: $2^2 = 4$

Randomly sample lots of points (darts) in the square.

The proportion of the points that are in the circle should be about $\frac{\pi}{4}$.

example:

$$\frac{\pi}{4} \approx \frac{3141}{4000}$$

Suppose we have M points, and p of them are in the circle.

Then: $\frac{\pi}{4} \approx \frac{p}{M}$

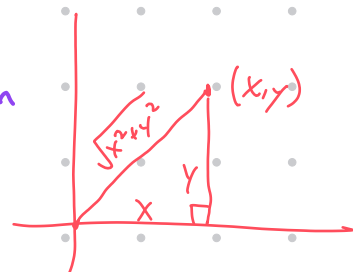
$$\pi \approx \frac{4p}{M}$$

Point: (x, y)

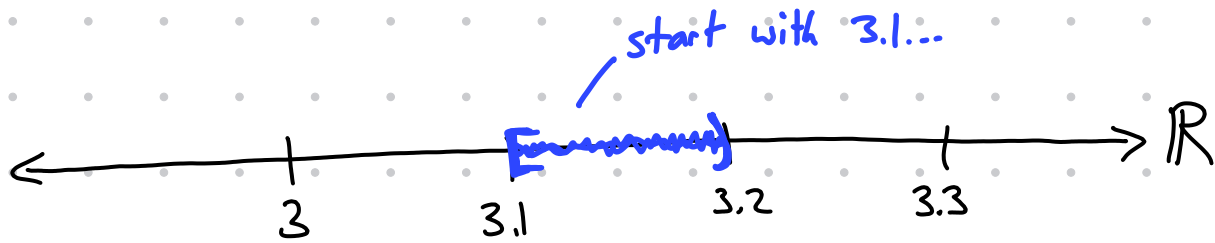
Distance from the origin: $\sqrt{x^2 + y^2}$

If $\text{dist} = \sqrt{x^2 + y^2} \leq 1$, then point is in the circle

It suffices to check: $x^2 + y^2 \leq 1$



Decimal numbers starting with digits 3.1:



$$\underline{3.1 \leq \text{result} < 3.2}$$