



$$x \sim \underline{U(-1, 1)}$$

$$y \sim \underline{U(-1, 1)}$$

$$\frac{\pi r^2}{(2r)^2} = \frac{\pi}{4}$$

$$U(0, 1) \rightarrow U(a, b)$$

$$a + (b-a) \cdot U$$

What are pseudo-random numbers?

A deterministic sequence of numbers in  $[0, 1]$  having the same relevant statistical properties as a sequence of independent  $U[0, 1]$  numbers.

Simple example:

- Start with a positive integer  $x_0$  90% in  $\mathbb{R}$
- for  $i = 1, 2, \dots$

$$x_i = (a \cdot x_{i-1} + b) \bmod M$$

$$u_i = \frac{x_i}{M}$$

where  $a, b, M$  are given integers that must be carefully chosen.