

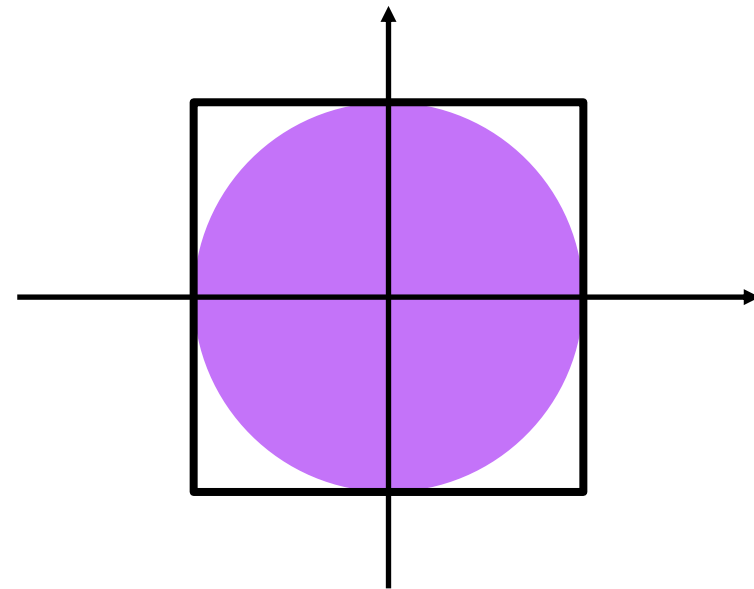
Hands-on activities 1

Mathematical functions, strings, loops

- The Monte Carlo simulation refers to a technique that uses random numbers and probability to solve problems.
- This method has a wide range of applications in computational mathematics, physics, chemistry, and finance

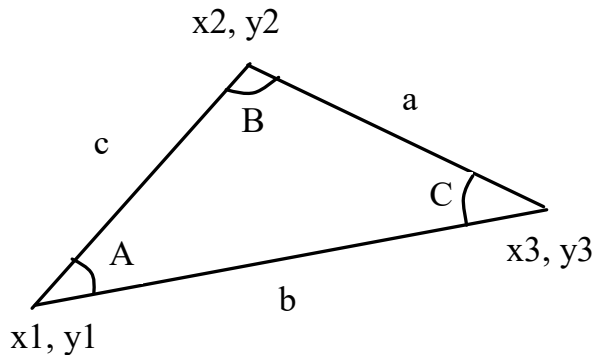
- Example - approximating π
- Idea:
 - $\text{circleArea} = \pi$
 - $\text{squareArea} = 4$
 - \Rightarrow
 - $\text{circleArea} / \text{squareArea} = \pi / 4$ or
 - $\pi = 4 \text{ circleArea} / \text{squareArea}$

- π can be approximated by
 - $4 * \text{numberOfHits} / \text{numberOfTrials}$
- Write a program that approximates π





- Write a program that prompts the user to enter the x- and y-coordinates of the three corner points in a triangle
- Displays the triangle's angles and area.
- Display an error message if the three points are collinear.



$$\begin{aligned} A &= \arccos((a * a - b * b - c * c) / (-2 * b * c)) \\ B &= \arccos((b * b - a * a - c * c) / (-2 * a * c)) \\ C &= \arccos((c * c - b * b - a * a) / (-2 * a * b)) \end{aligned}$$