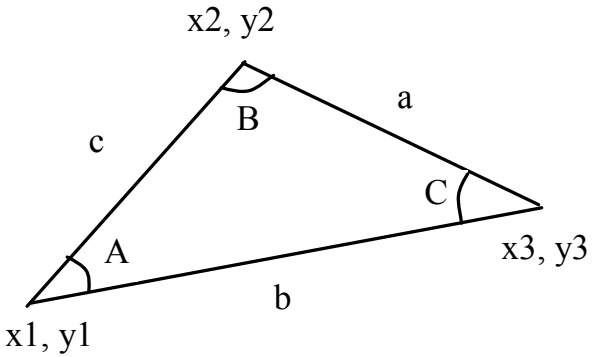
Hands-on activities 1

Mathematical functions, strings, loops

Computing angles and area of a triangle

- 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 is the three points are collinear.

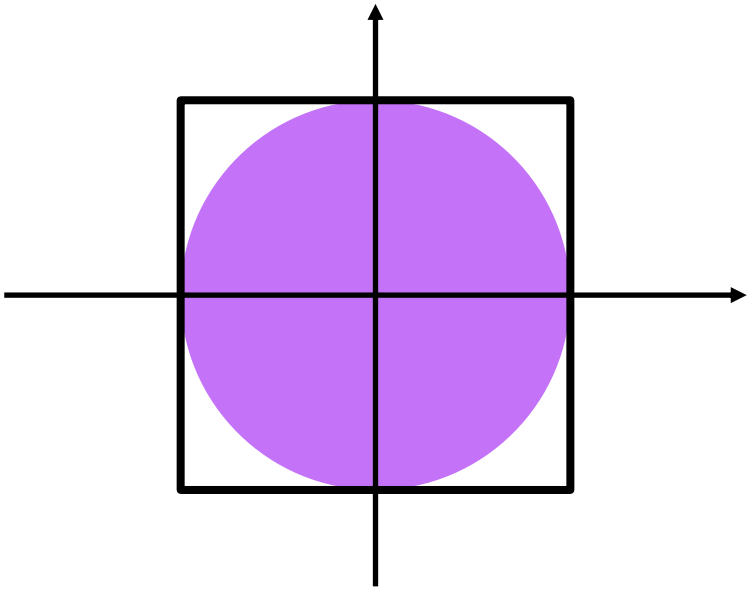



```
A = acos((a * a - b * b - c * c) / (-2 * b * c))
B = acos((b * b - a * a - c * c) / (-2 * a * c))
C = acos((c * c - b * b - a * a) / (-2 * a * b))
```

Monte Carlo simulation

- 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:
  - circleArea = π
  - squareArea = 4
  - =>
    - circleArea / squareArea = π / 4 or
    - π = 4 circleArea / squareArea



- π can be approximated by
  - 4 * numberOfHits / numberOfTrials
- Write a program that approximates π