Your task is simple. You are a drawing robot with the dream of drawing a diamond.

Question 1: Find the roots

In order to draw the diamond. You first must draw a square. Find the roots of these two equations as they will be used to graph the square.

a) Find the roots of $x^2 - 10x + 29$

b) Find the roots of $x^2 - 2x + 5$

Question 2: Draw the Square

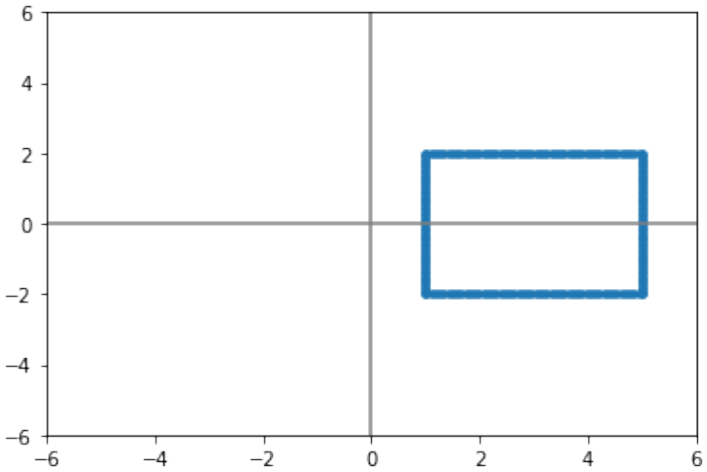
Draw the 4 roots from part 1 on an Argand diagram (a plot where the x-axis represents real numbers such as 3 and the y-axis is imaginary numbers such as $5i$). Make sure to label the axis as Im and Re (for real and imaginary numbers) as well as all of the points.

a) Label the axis Im and Re (for real and imaginary numbers)

b) Plot the 4 roots (should be $5 \pm 2i$ and $1 \pm 2i$)

c) Label the roots

d) Check that it looks similar to the plot below



Question 3: Making the diamond

We are going to rotate the square by 45 degrees.

a) Multiply the 4 points by $(1 + i)$. This is effectively a complex number that specifies a 45 degree rotation around $0 + 0i$.

b) Plot the result on your original Argand diagram with the square

c) Notice how the diamond (orange shape) looks a little bit bigger than the original square. This is because we are scaling the square by $\sqrt{2}$.

d) Good work! You have fulfilled your lifelong goal of drawing a diamond!