1. Sketch the set of points determined by the equality $|z + i| = 2$ by using Matlab.

2. Find the roots of the polynomial $z^6 - z^4 + 2 = 0$ by using the `roots` function of Matlab.

3. Write a Matlab function which demonstrates the below mapping:

\[ W = Z^2 \]
4. Write a Matlab function that will find and plot all roots of the equation \( z^n = z_0 \) where \( n \) is an integer and \( z_0 = r_0 e^{i\theta_0} \). Your program should take \( r_0, \theta_0 \) and \( n \) as inputs and give all the roots as an output in a vector. It should also plot all the roots on the circle that contains the roots. So your function definition in Matlab should be something like this:

\[
\text{function myroots = rootplot}(r_0, \theta_0, n)
\]

Here \( \text{myroots} \) is the output vector which contains all of the roots and \( \text{rootplot} \) is the name of the function. By using your function, find and plot the roots of the following equations:

a) \( z^8 = 1 + i \)  

b) \( z^{10} = 1 + \sqrt{3}i \)  

c) \( z^{20} = \sqrt{2} + \sqrt{2}i \)  

d) \( z^{15} = 1 + 3i \)

Note: Your plot should be something like this: