1. We have been graphing on the Cartesian plane, with x’s left and right, and y’s up and down. Let us imagine, instead, graph *Real* numbers left and right, and *Imaginary* numbers up and down. For example, 2 + 3i would be graphed like (2,3) and -1 - i just like (-1,-1). Choose six more complex numbers to graph below, including some with no real, and some with no imaginary component.



2. Of course, we will not be proceeding in a rectangular plane, but in a polar one! Complex numbers are typically denoted with the variable *z*. If *z = a + bi*, a right triangle is indicated, with width *a* and height *b*. What formula can we use to find the hypotenuse, *r*?

3. Which trigonometric function will allow us to find the angle θ, given that we know the opposite and adjacent sides? What limitations does this trigonometric function bring? When will it fail?

4. Convert three of your complex numbers from #1 into polar form, using your formulae:

5. Why would it not be efficient to try to add or subtract complex numbers in polar form, rather than rectangular?

6. Convert 1 + i and -√3 + i into polar form:

7. Multiply the numbers as usual and convert the answer into polar. What do you notice about the product’s radius and angle, compared to the multipliers radii and angles?

8. Describe in your own words what you think the point of this problem set it.