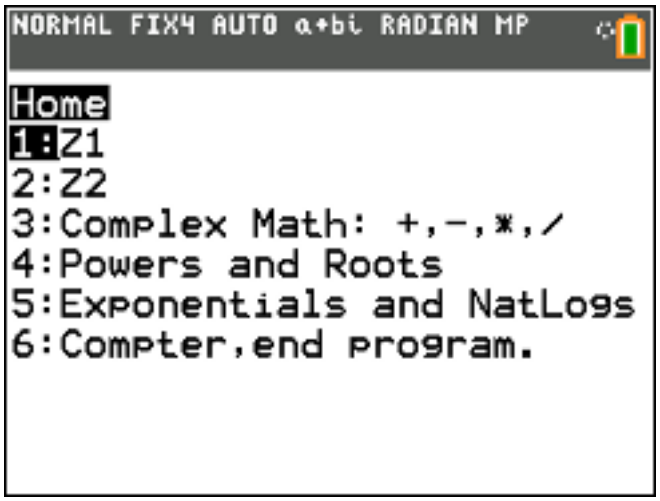
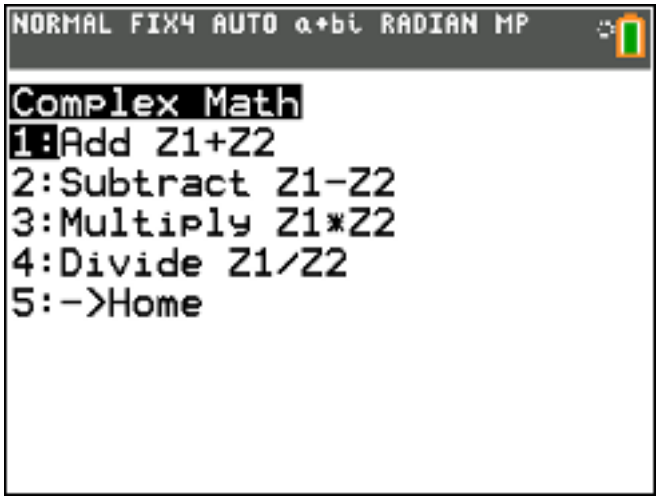
Complex Math

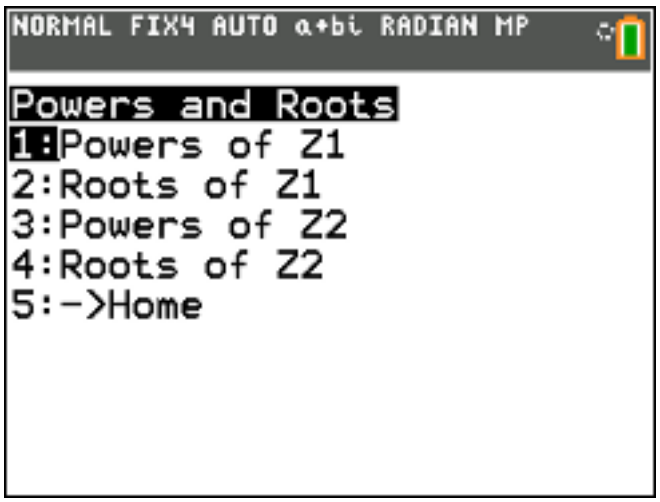
This application will do most of the complex math you will find in a Precalculus course in high school. There are four menus: Home, Complex Math, Powers and Roots, and Exponentials and NatLogs. Be sure to load both programs; SUBZ is a subroutine.



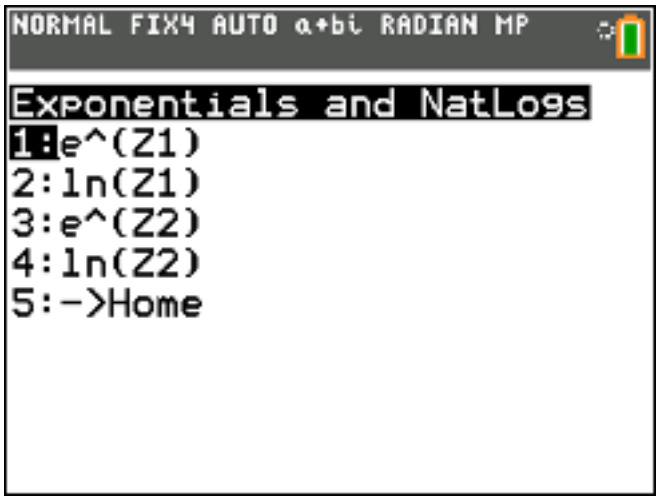
The Home menu lets you enter 1 or 2 complex numbers, Z1 and/or Z2. Menu items 3, 4, and 5 take you to the menus that do the math.



The Complex Math menu lets you do basic arithmetic with complex numbers.



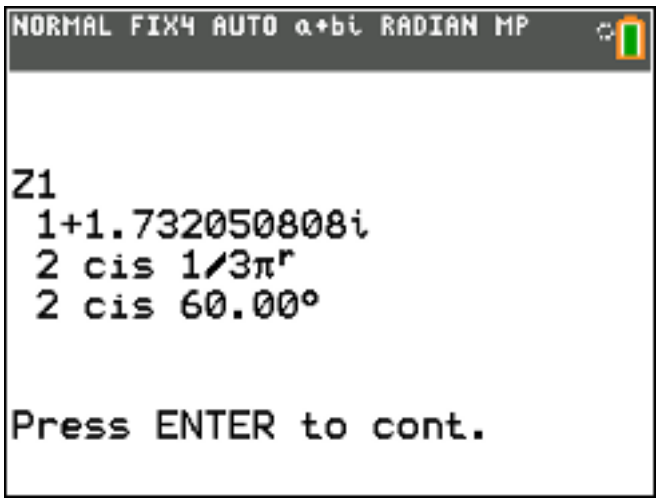
The Powers and Roots menu lets you powers and roots of complex numbers. The roots function will find all the roots; for instance, if you want the 5^{th} root of a number, it will find all 5 roots.



And finally, the Exponentials and NatLogs menu will let you compute the exponential or natural log (ln) of a complex number.

You can enter a complex number in either rectangular or trigonometric form. For instance, enter $1 + i\sqrt{(3)}$:

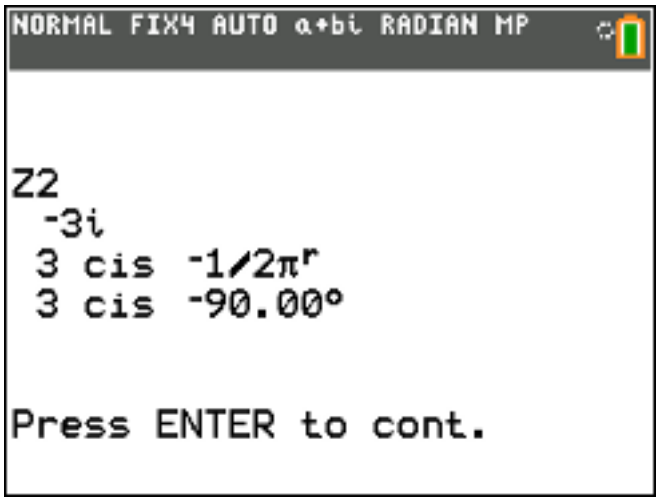
Then press ENTER.



After you press ENTER, the screen will show you first the rectangular form and then the two trigonometric forms, one in radians and the other in degrees.
Press ENTER to continue and you will be back at the Home screen.

Note: All math done in this app is done with the rectangular form of the complex numbers.

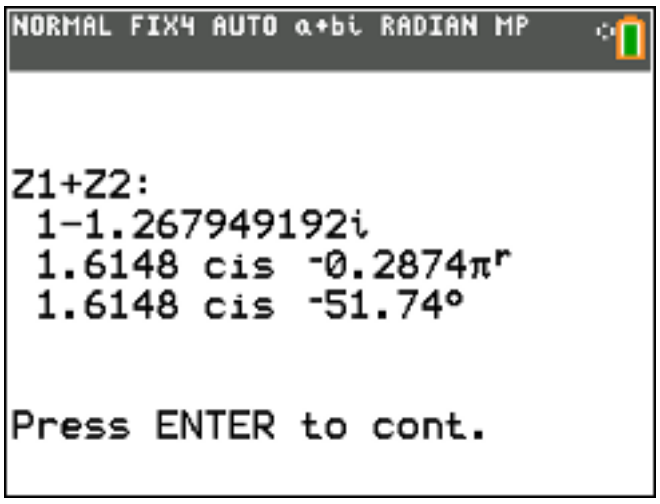
Now enter -3i in Z2.



Now that two complex numbers are entered, you can, for instance, add them.

Press ENTER to continue and then press 3 to do complex math.

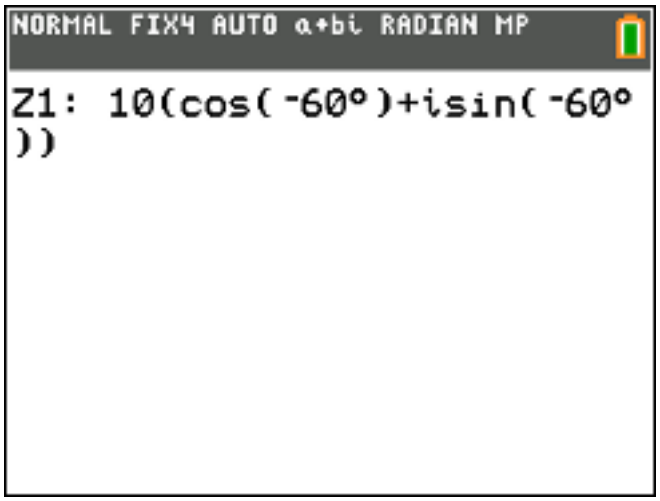
Now, press 1 to add Z1 and Z2.



This is the sum of Z1 and Z2. **The sum, or any other computation with two numbers, is stored in Z1.**

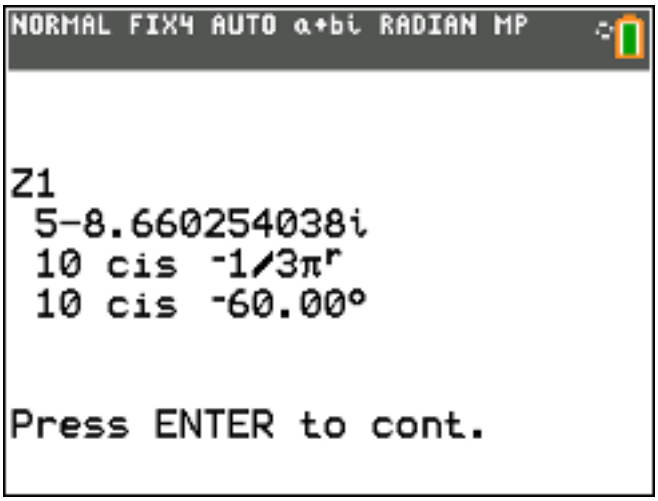
Entering complex numbers in trigonometric form. This form is: $r(\cos(\theta) + i \sin(\theta))$. If θ is in radians, just enter its value. If θ is in degrees, enter the value with the degree sign. Another way to enter the trigonometric form is: r*e^(i*θ).

Enter $10(\cos(-60°) + i \sin(-60°))$ in Z1.



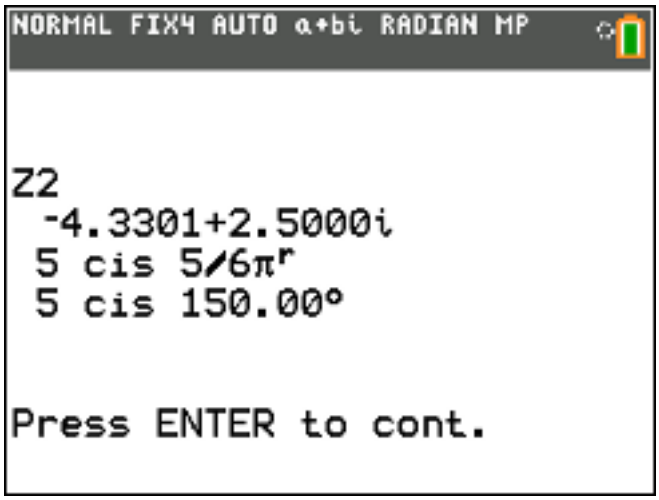
The degree sign on the TI-84 is in 2nd angle.

Press ENTER.

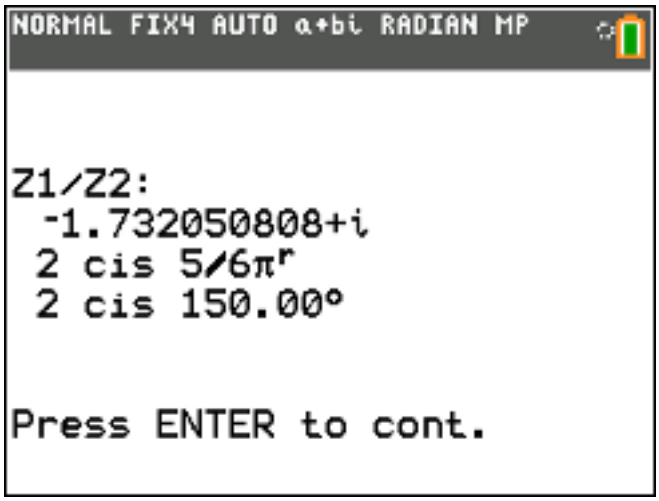


°Press ENTER to get back to the Home screen.

Then enter 5(cos(150°) + i sin(150°)) in Z2 and press ENTER.

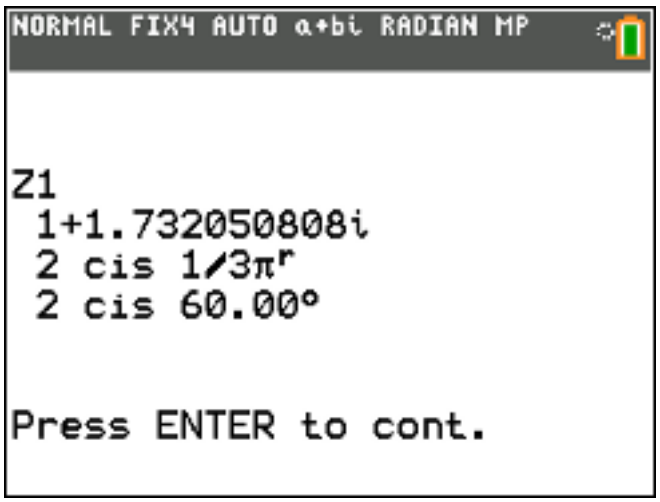


Press ENTER to continue. Then press 3 to do complex math. Now press 4 to divide Z1 by Z2.



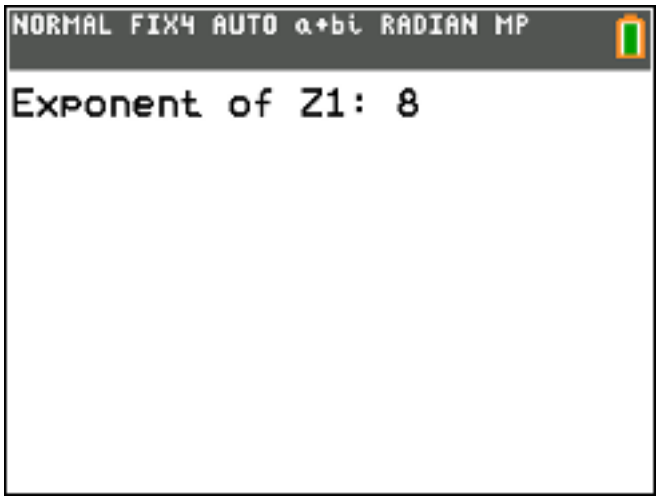
The answer in all three forms.

Next problem: find $(1 + i\sqrt{(3)})\wedge 8$. First, enter $1 + i\sqrt{(3)}$.

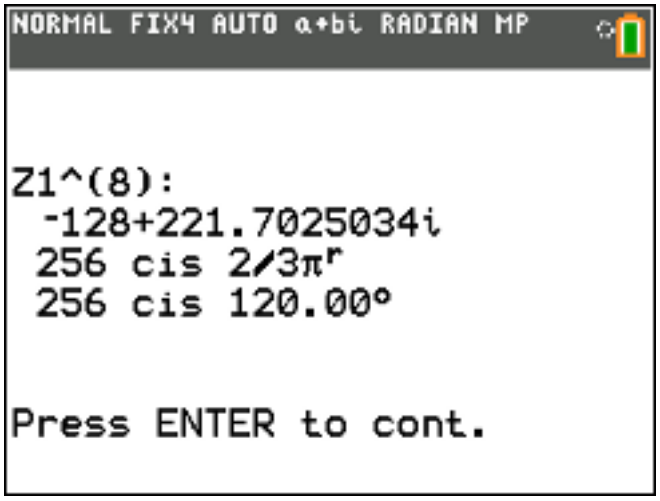


Press ENTER to go to the Home screen.

Press 4 to go to Powers and Roots. Press 1 to go to Powers of Z1.



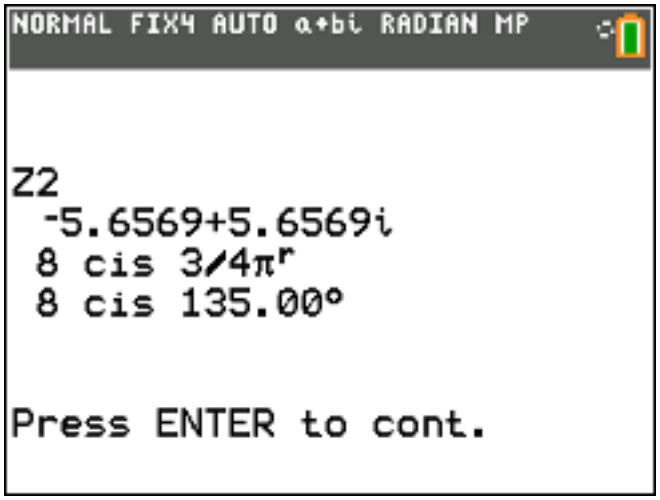
Enter the exponent, 8, and press ENTER.



Here is the answer in all three forms.

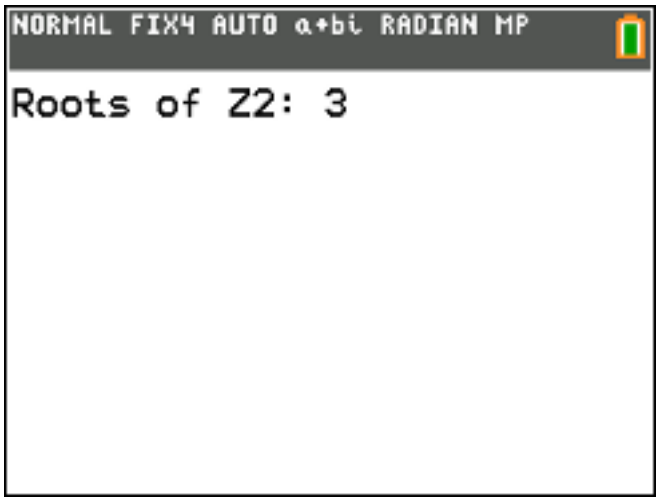
Next problem: Find the three complex roots of $8(\cos(135°) + i \sin(135°))$.

Go back to the Home screen and enter this complex number in Z2.

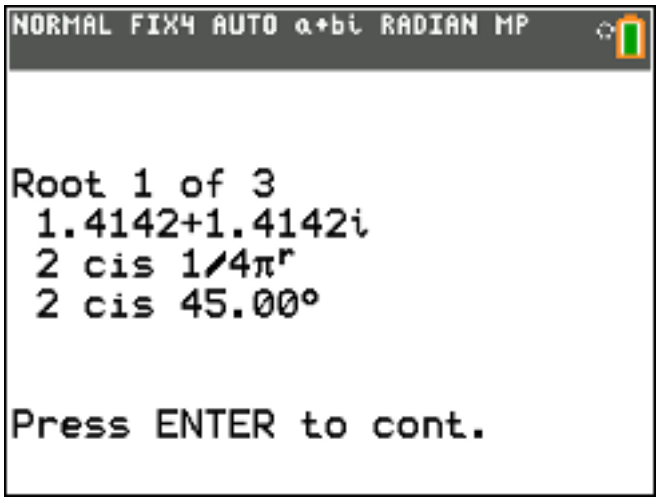


Press ENTER to continue. Press 4 to go to the Powers and Roots menu.

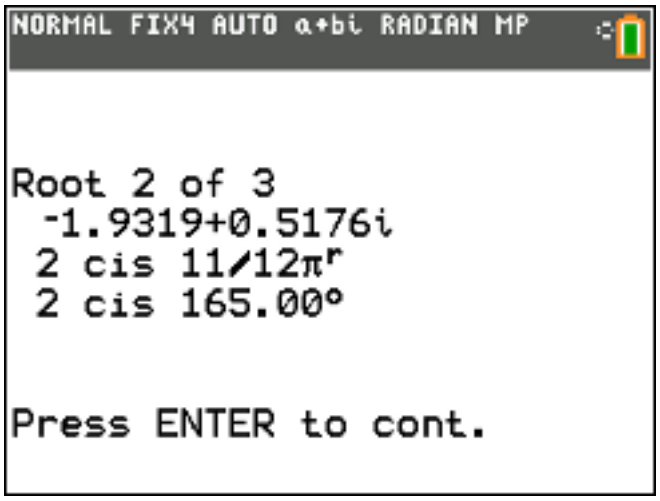
Then press 4 (Roots of Z2) and enter 3 for the cube roots.



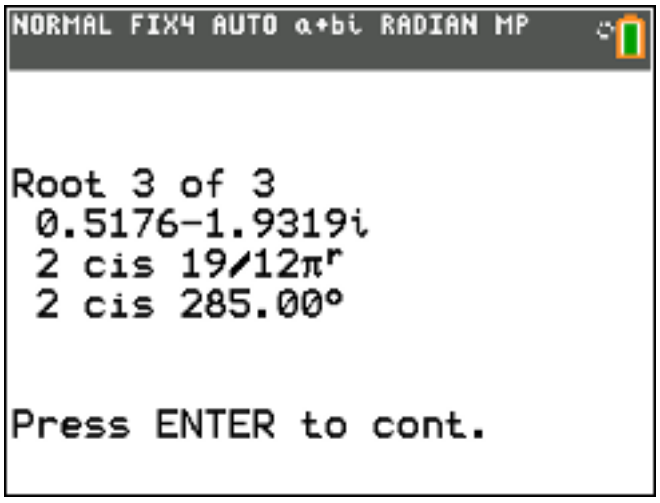
Press ENTER.



The first root.

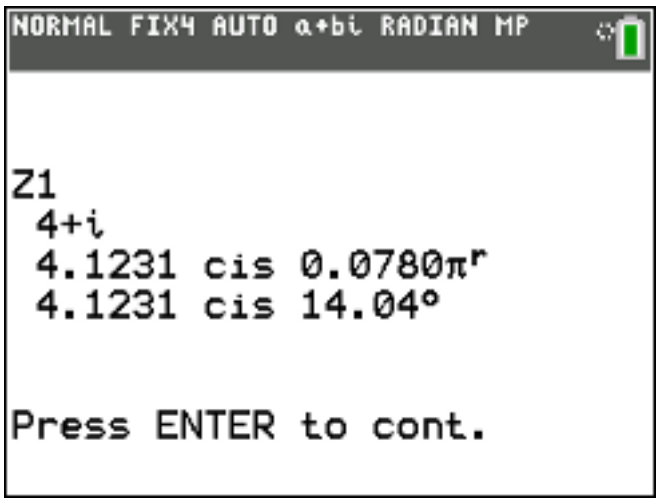


The second root.



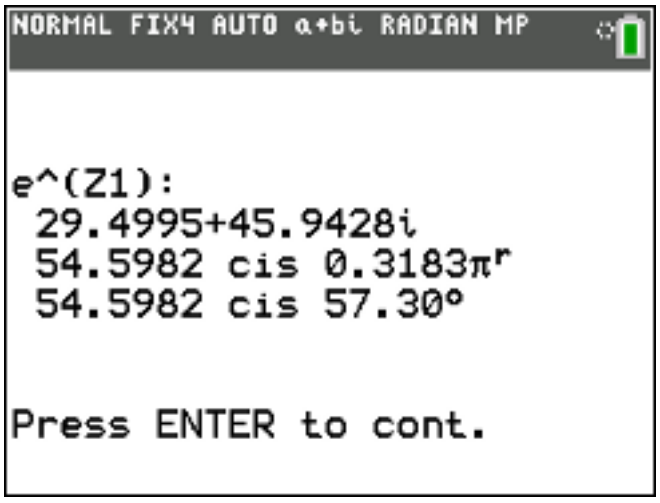
The third root.

Next problem. Find e^(4+i). Go to the Home screen and enter 4+i in Z1.

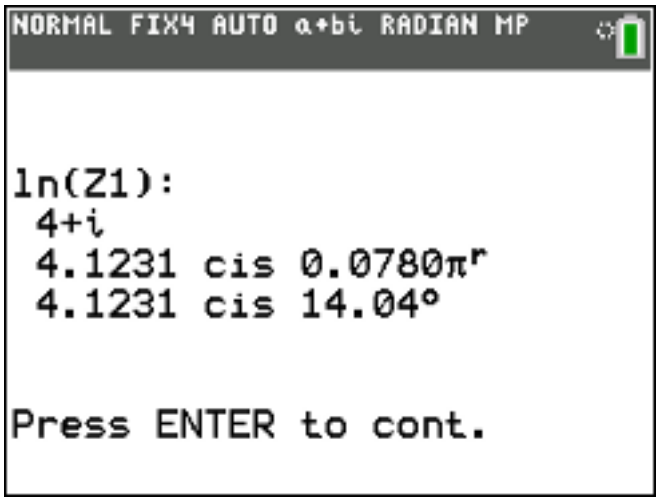


Press ENTER to go to the Home screen and then press 5.

Press 1 to find e^(4+i).



Now go to the Home screen and press 5 again. Then press 2 to find ln(Z1).



You are right back where you started from!

If you have any questions, please email me at: don.phillips@gmail.com.