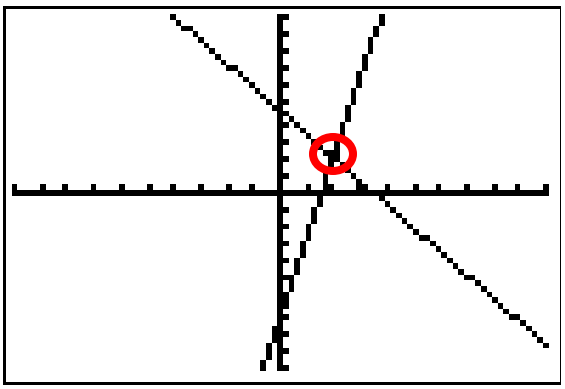
Graphically solving a System of two Linear Equations in Two Variables.



Graph

We will use the fact that the solution to a system of equations of two variables and two equations occurs at the point the graph of the two equations intersect.

Remember that every point (x,y) on the graph of an equations represents a ordered x,y pair that is a solution to that equation. The solution to a system of equations is the ordered x,y pair that satisfies both equations. The solution point must lie on both graphs and the point of intersection is the only point that does that.

We will now show how to find the point of intersection. Let us solve the following system:

$4x+3y=14$

$9x-2y=14$

First we must solve these equations for y because we can only enter a y = equation in the calculator

$4x+3y=14$

$3y=14-4x$ *divide both sides by* 3

$$y=\frac{(14-4x)}{3}$$

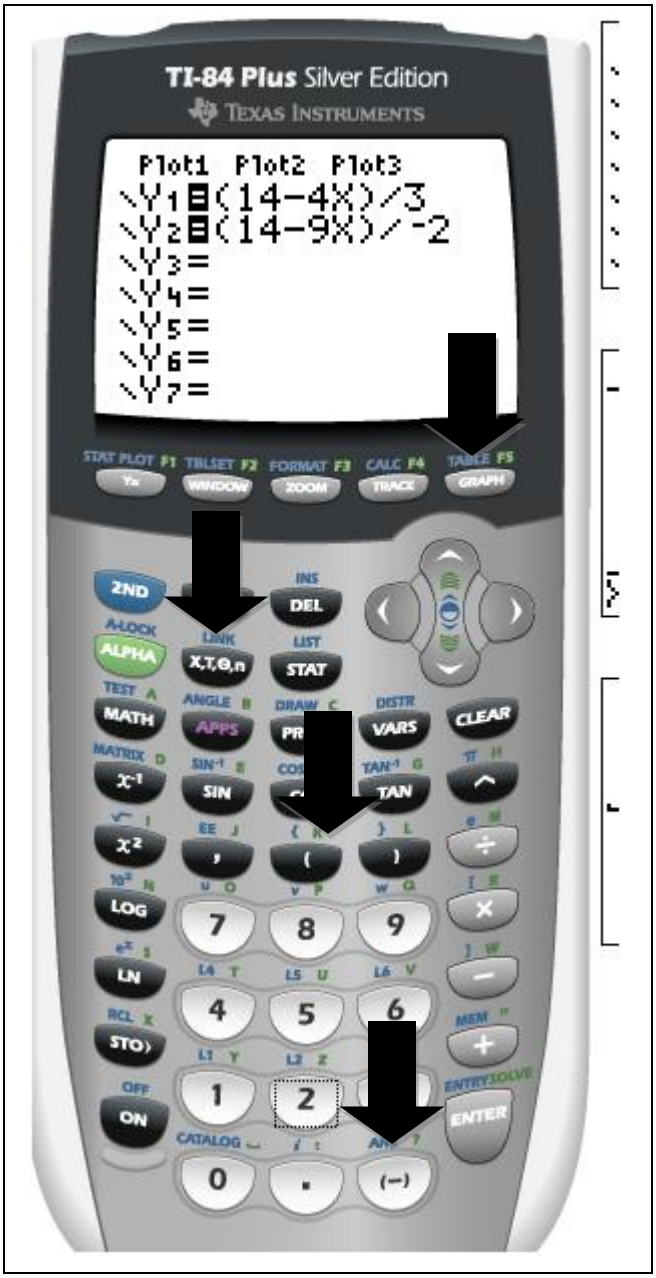
$9x-2y=14$

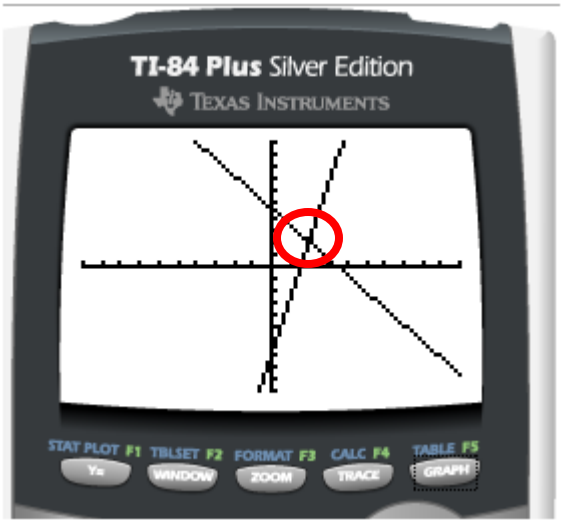
$-2y=14-9x$ *divide both sides by* -2

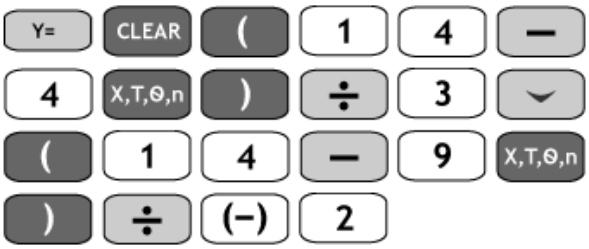
$$y=\frac{(14-9x)}{-2}$$

We could take more steps to put the equations above in slope intercept form if we were graphing them by hand. However that is not necessary with the calculator.

We will now enter these two equations into the calculator . Press "y=" to get to the equation screen. Press "clear" to clear any equations already in the calculator.



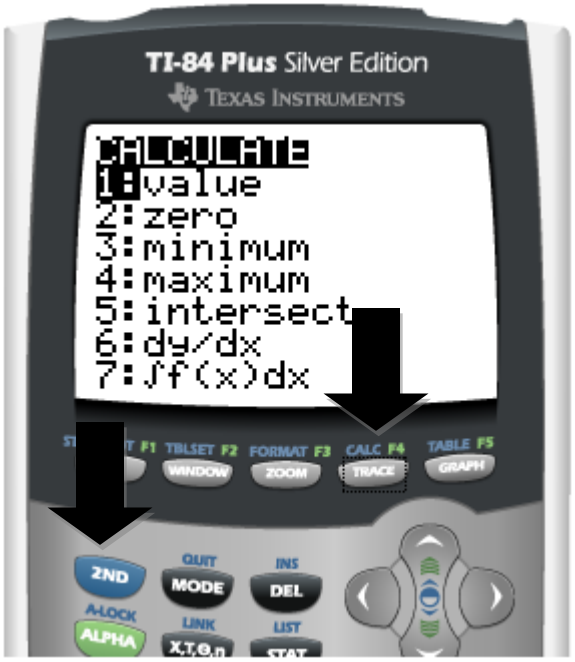




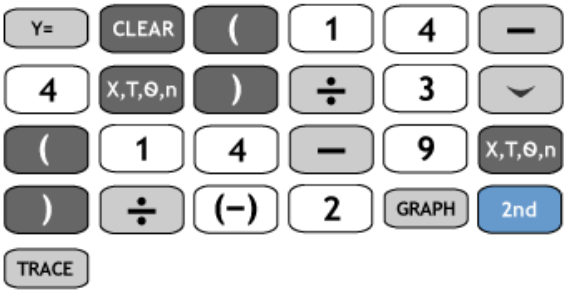
The key presses to in enter the two equations into the calculator are shown above. Notice we use the X,T,Θ,n key for x shown by the second from the top arrow on the picture to our left. And we use the parenthesis shown by the third arrow to insure the 14 and -4x are both divided by 3 in the first equation. Finally we use negative key (−) shown by the bottom arrow for the negative 2 divisor in the second equation. We used the − on the right side of the calculator when we wanted to subtract as in 14-4x. But if there is nothing to subtract from and we wish to denote a negative number or the negative of a variable we must use (−). Study how these two keys are used and make sure you understand when to use each.

Finally press graph (top arrow) to graph the two equations.

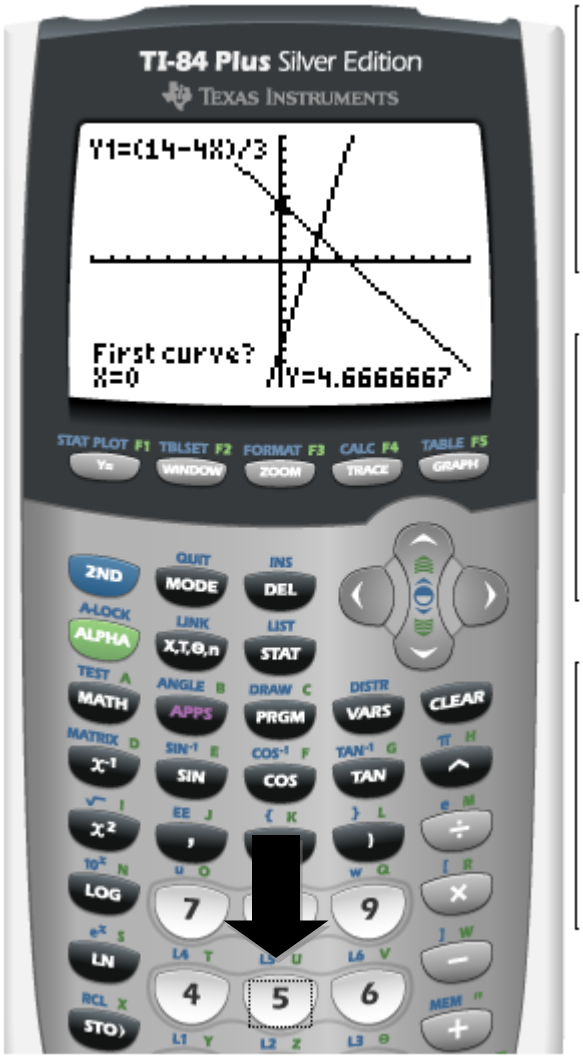
We see the two equations do intersect as shown by the circle. We must find the intersection.



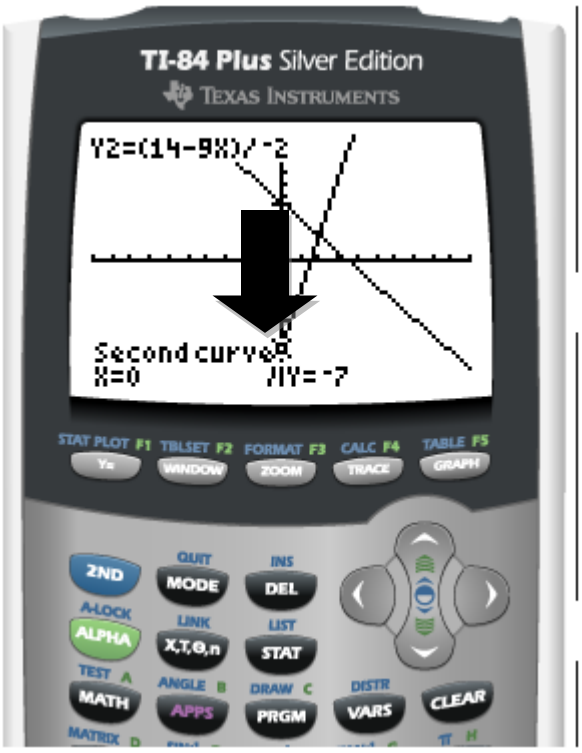
Our key presses so far are shown below.



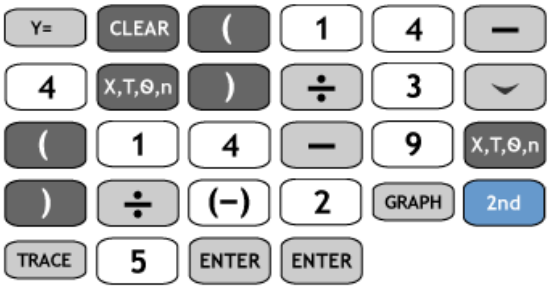
We press 2nd then TRACE to get to the screen at our left. We need to find the coordinates of the intersection so we press 5 for intersection from the menu.

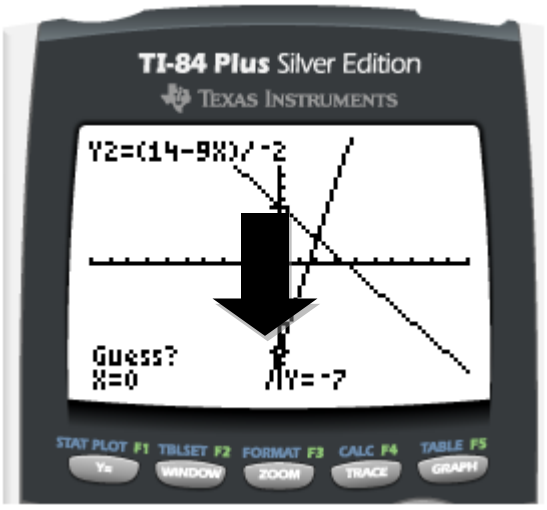


The calculator is asking us which curves we want it to find the intersection of. If we have cleared all the old equations in the first step there should only be 2 graphs and so the cursor should be on the first curve and all we have to do is press enter to confirm that this one of the curves we want to intersect. Press enter at this time.

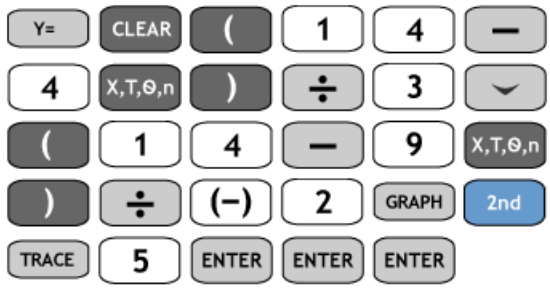


Notice the cursor jumped to the next curve and the calculator is asking us to confirm that this is the other curve we want it to find the intersection of. Press enter to confirm. So far we have pressed the keys below.





The calculator is now asking for a guess . You could move the cursor closer to the intersection using the right arrow (up and down arrows jump you to other curves, only left and right arrows move you along curves). The present location of the cursor is close enough for our purposes. Press enter (the third time in a row) to accept this guess. The complete list of key presses to solve this system is shown below.



We now have a solution x=2 and y=2. That is the coordinates of the point of intersection.