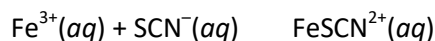


Using the TI Solver

The example below is used to show how to use the “solver”:

If 10.00 moles of Fe^{3+} is added to 8.00 moles of SCN^- in 1.00 L of solution and allowed to reach equilibrium, what is the concentration of FeSCN^{2+} at equilibrium?



$$K = 0.333 = \frac{[\text{FeSCN}^{2+}]}{[\text{Fe}^{3+}][\text{SCN}^{-}]}$$

	$\text{Fe}^{3+}(\text{aq})$	+ $\text{SCN}^{-}(\text{aq})$	$\text{FeSCN}^{2+}(\text{aq})$
Initial	10.00 M	8.00 M	0
Change	-X	-X	+ X
Equilibrium	10.00 - x	8.00 - x	X

So you can substitute the equilibrium values into the expression.

$$K = 0.333 = \frac{[X]}{[10.00 - x][8.00 - x]}$$

Start by opening the equation solver. Use the math key, then scroll down to the solver, usually 0.

Since this equation solver is set equal to zero, you need to rearrange your equilibrium constant expression.

$$0 = \frac{[X]}{[10.00 - x][8.00 - x]} - 0.333$$

The next step is to enter the equation on the calculator. Be sure to use parenthesis and subtract the constant.

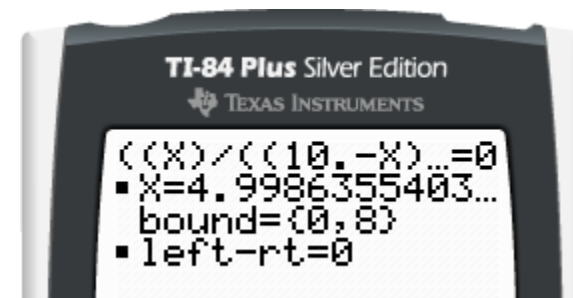
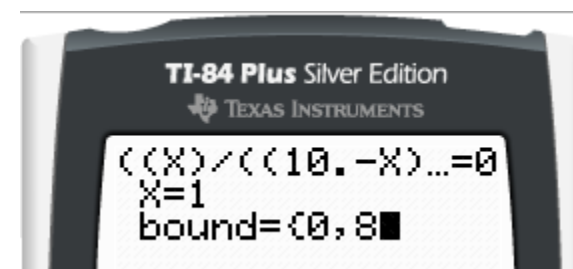
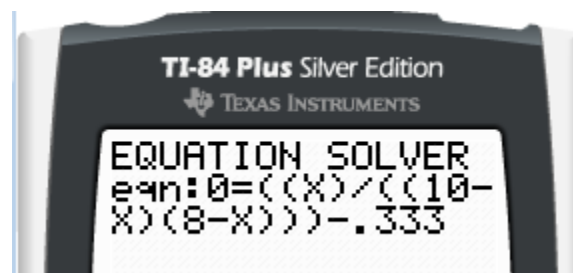
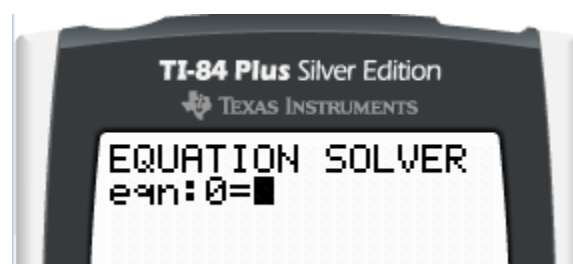
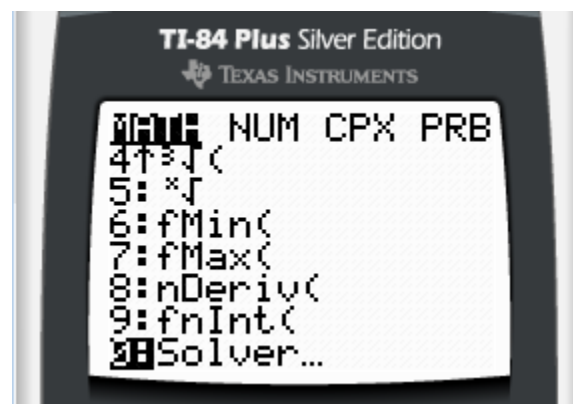
Scroll down to select your bounds. They are based on the K expression that you wrote above. We are solving for the value of X. We know (based on the ICE diagram) that X must be positive, since the value of FeSCN^{2+} can't be less than 0. This gives us the lower bound of zero.

The maximum value of X comes from the SCN^- in this example. We know that X can't be larger than 8, if it were larger than 8 we would be left with a negative concentration of SCN^- .

This gives us a bound of {0,8.00}. Choose a value of X that is within the bounds this is just giving your calculator a place to start guessing.

Then, while you are still on the line that starts X=, choose Solve, by hitting the *alpha* key and then the *enter* key.

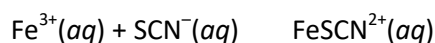
The calculator will give you the value of X, in this case the answer is 5.00, but ALWAYS make sure to scroll over to the right to check for an exponent.



Using the TI Solver – CE

The example below is used to show how to use the “numeric solver”:

If 10.00 moles of Fe^{3+} is added to 8.00 moles of SCN^- in 1.00 L of solution and allowed to reach equilibrium, what is the concentration of FeSCN^{2+} at equilibrium?



$$K = 0.333 = \frac{[\text{FeSCN}^{2+}]}{[\text{Fe}^{3+}][\text{SCN}^{-}]}$$

	$\text{Fe}^{3+}(\text{aq})$	+ $\text{SCN}^{-}(\text{aq})$	$\text{FeSCN}^{2+}(\text{aq})$
Initial	10.00 M	8.00 M	0
Change	-X	-X	+ X
Equilibrium	10.00 - x	8.00 - x	X

So you can substitute the equilibrium values into the expression.

$$K = 0.333 = \frac{[X]}{[10.00 - x][8.00 - x]}$$

Start by opening the equation solver. Use the math key, then scroll down to the solver, usually B.

This version of the calculator allows you to set one side of the equation equal to another. Enter the equation on the right into the first box, and the constant into the second.

Scroll down to select your bounds. This is the range of possible values that your “X” could be.

They are based on the K expression that you wrote above. We are solving for the value of x. We know (based on the ICE diagram) that x must be positive, since the value of FeSCN^{2+} can't be less than 0. This gives us the lower bound of zero.

The maximum value of x comes from the SCN^- in this example. We know that X can't be larger than 8, if it were larger than 8 we would be left with a negative concentration of SCN^- . This gives us a bound of {0,8.00}.

Then choose a value of x that is within the bounds, this is just giving your calculator a place to start guessing. I chose 1, but any number in the bounds will work.

Then, while you are still on the line that starts X=, solve to find the value of x, by hitting the graph button below “solve” on the screen.

The calculator will give you the value of X, in this case the answer is 5.00.

