

Solving Equations Using TI-83/TI-83+ SOLVER

Basic procedure:

1. Press **MATH**
2. Press **0**: (selects EQUATION SOLVER)
3. Press **▲** then **CLEAR** (clears any existing equation)
4. Enter the equation to be solved. The equation must be algebraically rearranged to be equal to zero.
5. Press **ENTER**, enter a guess value
6. Press **ALPHA** **ENTER** (execute the SOLVE is on the **ENTER** key)

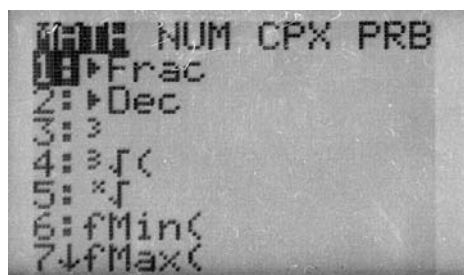
If solving chemical problems, the guess should be chemically valid and, if possible, near the solution value. If the SOLVER result is not chemically valid, try a different guess value.

Example:

For a particular chemical equilibrium problem, the solution for equilibrium concentrations is

$$0.45 = \frac{(0.10 - 2x)^2}{(0.05 + x)(0.15 + 3x)^3}$$

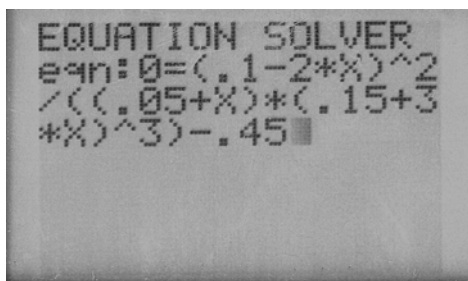
1. Press **MATH**



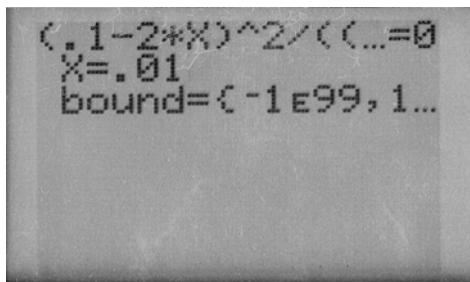
- 2,3. Press **0**, **▲**, **CLEAR**

Enter the equation

$$0 = \frac{(0.10 - 2x)^2}{(0.05 + x)(0.15 + 3x)^3} - 0.45$$

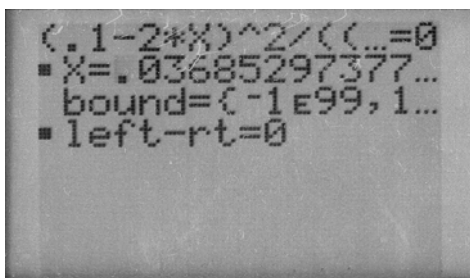


4,5. Press **ENTER**, enter a guess. In this example the guess is 0.01.



```
(.1-2*X)^2/((...)=0
X=.01
bound={-1E99, 1...
```

6. Press **ALPHA** **ENTER** to execute the SOLVE



```
(.1-2*X)^2/((...)=0
▪ X=.03685297377...
bound={-1E99, 1...
▪ left-rt=0
```

The numerical solution is 0.0369.

Demonstrate that if a chemically invalid guess (such as 0.05) is used, SOLVER will return a chemically invalid result (0.079)¹. Likewise, an improper guess of 0.2 returns a solution of 0.395. Entering a guess of a negative number may yield an acceptable result or an erroneous result; for example, a guess of -0.01 yields the correct 0.0369 but a guess of -0.1 yields the chemically invalid result of -0.711.

¹ 0.079 is invalid since $0.05 - 2(0.079)$ is a negative number.