Equation Solver

'If there is an equal sign then EQUA is an option'.

Turn calculator on!

Menu

Scroll to EQUA and press EXE, and then choose F3: **solver**

A formula with values will most likely appear. This is the last EQUA screen that was used. Delete the formula by pressing DEL F2 and F1 (maybe more than once) until you see

Eq:

Let's imagine we need to solve this! We (should) know X must be 5 but let us check!

$$25 = 20 + X$$

- 25
- shift and **.** (this gets you the equals sign, =)
- \+ (yes, add 😊)
- X,θ,T (this is the blue button below the red ALPHA button and will give you X)
- Then press EXE followed by F6 to solve (or press EXE twice).

Surprise! The answer says X = 5 (ignore everything else!) We have proved what we already knew 😊

Try this one

$$25 = 20 + 3X$$

Now X here is 1.67

Try this slightly harder one

$$256 = \frac{X^2}{0.200^3 \times 0.400}$$

I do ($0.200^3 \times 0.400$) in brackets

X = 0.905

Try this hard one

$$34 = \frac{0 \cdot 6^2}{2.5^3 \times X}$$

$34 = 0.6^2 \div (2.5^3 \times X)$ You need to bracket the bottom line as 6^2 is divided by all of it.

$$X = 6.78 \times 10^{-4}$$

Now some real chemistry examples.

2018 AS 91164: Question One

(d)

Nitrogen gas, $N_2(g)$, reacts with hydrogen gas, $H_2(g)$, to produce ammonia gas, $NH_3(g)$, as shown by the following equation:

$$N_2(g) + 3H_2(g) \rightarrow 2NH_3(g) \quad \Delta_r H^o = -92.0 \text{ kJ mol}^{-1}$$

Calculate the average bond enthalpy of the **N–H** bond in NH_3, using the average bond enthalpies in the table below.

Bond	**Average bond enthalpy kJ mol^{-1}**
N≡N	945
H–H	436

$\Delta_r H = \Sigma(\text{bonds broken}) - \Sigma(\text{bonds made})$ MEMORISE THIS!

Bonds broken

N≡N 945

3 x H-H 436 x 3

Total = 2253

Bonds made

6 x N-H 6X

$\Delta_r H = \Sigma(\text{bonds broken}) - \Sigma(\text{bonds made})$

-92 = 2253 – 6X

Using equation solver **X = 391 kJ mol^{-1}**

2019 AS91166: Question Two

(c) (i) Nitrogen, $N_2(g)$, can also be reacted with oxygen, $O_2(g)$, to give nitrogen dioxide, $NO_2(g)$, and the following K_c expression would apply.

$$K_c = \frac{[NO_2]^2}{[N_2][O_2]^2}$$

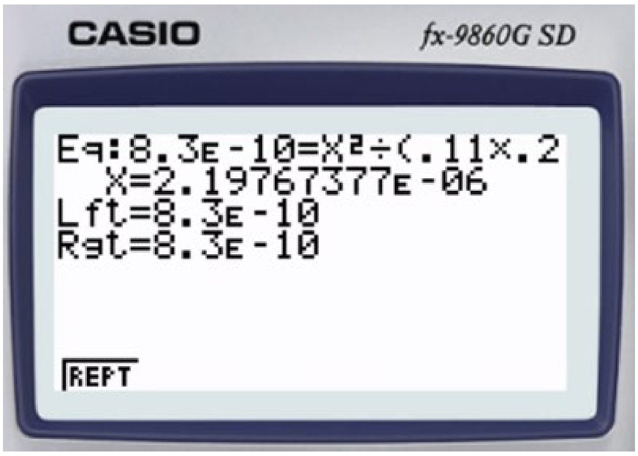
The K_c for the reaction at 25°C is 8.30×10^{-10}.

Calculate the concentration of nitrogen dioxide, NO_2, if the concentration of oxygen, O_2, is 0.230 mol L^{-1} and the concentration of nitrogen, N_2, is 0.110 mol L^{-1}.

Give your answer to appropriate significant figures.

$$K_c = \frac{[NO_2]^2}{[N_2][O_2]^2}$$

$$8 \cdot 3 \times 10^{-10} = \frac{x^2}{0.110 \times 0 \cdot 230^2}$$



Note (.11 x .23^2) isn't showing on screenshot as the equation is long.

X = $2.19767377 \times 10^{-6}$ mol L^{-1}

X = 2.20×10^{-6} mol L^{-1} (3 s.f.)