# **Algebra in chemistry**

***Education in Chemistry*
April 2020**
[rsc.li/2VvRtaZ](https://rsc.li/2VvRtaZ)

**Complete the following questions, showing your working at each step.**

**Q1** $\frac{x}{y}=z$

(i) Make *y* the subject; (ii) make *z* the subject.

**Q2** $a=\frac{b}{c}$

(i) Make *b* the subject; (ii) make *c* the subject.

**Q3** $Moles=\frac{Mass}{Gram Formula Mass}$

(i) Make *Gram Formula Mass* the subject; (ii) make *Mass* the subject.

**Q4** $ Concentration=\frac{Moles}{Volume}$

(i) Make *Volume* the subject; (ii) make *Moles* the subject.

**Q5** $∆G= ∆H-T∆S$

(i) Make $∆H$ the subject; (ii) make $T$ the subject; (iii) make $∆S$ the subject.

**Q6** $4a=12b-16$

For the next step, perform an operation to obtain a single ‘*a’* term from the ‘*4a*’ term.

**Q7** $4y+2z=10a-4x$

For the next step, perform an operation to obtain a single ‘2*y*’ from the ‘4*y*’ term.

**Q8** $∆G= ∆H-T∆S$

For the next step, perform an operation to obtain a ‘$-∆S'$ term from the $'-T∆S'$ term.

**Q9** The combined gas law is given by,

$$\frac{P\_{1}V\_{1}}{T\_{1}}=\frac{P\_{2}V\_{2}}{T\_{2}}$$

Make each of the following the subject: (i) $P\_{1}$; (ii) $V\_{1}$; (iii) $T\_{1}$; (iv) $P\_{2}$; (v) $V\_{2}$; (vi) $T\_{2}$; (vii) $P\_{1}V\_{1}$; (viii) $P\_{2}V\_{2}$; (ix) $P\_{1}T\_{2}$; (x) $P\_{2}T\_{1}$; (xi) $\frac{P\_{1}}{T\_{1}}$; (xii) $\frac{P\_{2}}{T\_{2}}$; (xiii) $\frac{V\_{1}}{T\_{1}}$; (xiv) $\frac{V\_{2}}{T\_{2}}$; (xv).

How many other permutations can you find?

**Q10** For the reaction H2 + I2 ⇌ 2HI, the equilibrium expression is:

$$K\_{c}=\frac{[HI]^{2}}{\left[H\_{2}\right][I\_{2}]}$$

(i) Make $\left[H\_{2}\right]$ the subject; (ii) make $\left[I\_{2}\right]$ the subject; (iii) make $\left[HI\right]$ the subject.