The Equilibrium Constant

Depends upon:

Balanced Chemical Equation

Temperature

Independent of Initial concentrations, Volume, Pressure

For the general chemical equation:

$$aA + bB \rightleftharpoons cC + dD$$

$$K = \frac{a_C^{\,c}\, a_D^{\,d}}{a_A^{\,a}\, a_B^{\,b}} = \frac{P_{products}^{\,coef}}{P_{reactants}^{\,coef}} \quad \textbf{for gases}$$

$$= \frac{[prods]^{coef}}{[reacts]^{coef}} \quad \textbf{for solutions}$$

Where all are *equilibrium* concentrations.

Note: The activities of pure liquids and solids are equal to 1.
They are not written in the equilibrium constant expression.

Relationship between K_p and K_c *for gases*:

$$K_p = K_c\,(RT)^{\Delta n_{gas}}$$

Manipulating K

1. Reverse reaction:	**Take reciprocal of K**	$K_{new} = 1/K$
2. Multiply reaction by n:	**Raise K to power of n**	$K_{new} = (K)^n$
3. Add reactions:	**Multipy K's**	$K_{new} = K_1 K_2$