Formula Sheet

Order of Operations

$$ac + bc = c(a + b)$$

exponents

$$a^n a^m = a^{n+m}$$

$$(a^n)^m = a^{nm}$$

$$(ab)^n = a^n b^n$$

$$a^0 = 1$$

$$a^{-n} = \frac{1}{a^n}$$

radicals

$$a^{\frac{n}{m}} = \sqrt[m]{a^n}$$

Unit Conversions

angles

$$2\pi = 6.28 \text{ rad} = 360^o$$

mass

$$1 \text{ kg} = 2.2 \text{ lbs.}$$

lengths

$$1 \text{ mile} = 1.6 \text{ km}$$
$$1 \text{ inch} = 2.54 \text{ cm}$$
$$1 \text{ m} = 3.3 \text{ ft}$$

volumes

$$1 \text{ gallon} = 3.78 \text{ Litres}$$

Concentrations (assume density of solvent water = 1 g/mL)

$$C = M/V = M/M = V/V$$

percentage (%)

$$x\%(w/v) = \frac{x[g]}{100[mL]} \qquad x\%(v/v) = \frac{x[mL]}{100[mL]} \qquad x\%(w/w) = \frac{x[g]}{100[g]}$$

parts

$$pph = x\%(w/v) \qquad ppt = \frac{x[g]}{1[L]} \qquad ppm = \frac{x[mg]}{1[L]} \qquad ppb = \frac{x[\mu g]}{1[L]}$$

molarity

M = molarity $\frac{[moles]}{[L]}$ FW = formula weight $\frac{[g]}{[mole]}$

Dilutions

$$C_1V_1 = C_2V_2$$

dilution = $\frac{\text{solute volume}}{\text{total/final volume}}$ dilution factor (DF) = $\frac{1}{\text{dilution}}$