Mr. Schneider presents...

Wave Formulae

Concepts	Formula	Units
Frequency = $\frac{\mathbf{1}}{\mathbf{period}}$	$f = \frac{1}{T}$	hertz = $\frac{1}{\text{sec}}$ **note**: T is period
Wave velocity = (**wavelength**)(**frequency**)	$v = \lambda f$	$\left(\frac{\text{meters}}{\text{sec}}\right) = (\text{meters})(\text{hertz}) = (\text{meters})\left(\frac{1}{\text{sec}}\right)$
Speed of sound = speed@0°C + (temp adj)(temp	$v_T = v_{0°C} + kT$	$v_{sound} = 331\frac{\text{meters}}{\text{sec}} + \left(0.60\frac{\text{meters}}{(\text{sec})(°\text{C})}\right)(T)$ **note**: T is temp
Beat frequency = $\lvert \text{frequency}_1 - \text{frequency}_2 \rvert$	$f_{beat} = \lvert f_1 - f_2 \rvert$	hertz = hertz
Index of refraction = $\frac{\text{light speed in vacuum}}{\text{light speed in medium}}$	$n = \frac{c}{v}$	$[\text{no units}] = \frac{\left(\frac{\text{meters}}{\text{sec}}\right)}{\left(\frac{\text{meters}}{\text{sec}}\right)}$
Photon energy = (Planck's constant)(frequency)	$E = hf$	joules = (joule · seconds)(hertz)
De Broglie wavelength = $\frac{\text{Planck's constant}}{\text{momentum}}$	$\lambda = \frac{h}{p} = \frac{h}{mv}$	$\text{meters} = \frac{(\text{joule}\cdot\text{seconds})}{\left(\text{kg}\cdot\frac{\text{meters}}{\text{sec}}\right)} = \frac{\left(\text{kg}\cdot\frac{\text{meters}^2}{\text{sec}^2}\right)(\text{sec})}{(\text{kg})\left(\frac{\text{meters}}{\text{sec}}\right)}$
$\left(\begin{matrix}\text{momentum}\\\text{error}\end{matrix}\right)\left(\begin{matrix}\text{position}\\\text{error}\end{matrix}\right) \geq \frac{\text{Planck's constant}}{2\pi}$	$\Delta p \Delta x \geq \hbar\left[= \frac{h}{2\pi}\right]$	$\left(\text{kg}\cdot\frac{\text{meters}}{\text{sec}}\right)(\text{meters}) \geq \frac{(\text{joule}\cdot\text{sec})}{1} = \left(\text{kg}\cdot\frac{\text{meters}^2}{\text{sec}^2}\right)(\text{sec})$

And for those of you who are algebraically challenged...

Basic Formula	Alternate Forms
$f = \frac{1}{T}$	$T = \frac{1}{f}$
$v = \lambda f$	$\lambda = \frac{v}{f}$ or $f = \frac{v}{\lambda}$
$n = \frac{c}{v}$	$v = \frac{c}{n}$ or $c = nv$
$E = hf$	$f = \frac{E}{h}$
$\lambda = \frac{h}{p}$	$p = \frac{h}{\lambda}$ or $h = p\lambda$