Prof Stick's

mostly good **Physic's LaTeX Cookbook**

A LaTeX cookbook for the NSW Stage 6 Physics Course

Formulae

Motion, forces and gravity

Equation	Latex
$s = ut + \frac{1}{2}at^2$	s = ut + \frac{1}{2} a t^2
$v = u + at$	v = u + at
$v^2 = u^2 + 2as$	v^2 = u^2 + 2as
$F_{net} = ma$	\Delta U = mg \Delta h
$\Delta U = mg\Delta h$	\Delta U = mg \Delta h
$W = F_\parallel s = F s \cos\theta$	W = F_\parallel s = F s \cos \theta
$P = \frac{\Delta E}{\Delta t}$	P = \frac{\Delta E}{\Delta t}
$K = \frac{1}{2}mv^2$	K = \frac{1}{2} m v^2
$\sum \frac{1}{2}mv^2_{before} = \sum \frac{1}{2}mv^2_{after}$	\sum \frac{1}{2} m v^2_{before} = \sum \frac{1}{2} m v^2_{after}
$\sum m v_{before} = \sum m v_{after}$	\sum m \vec{v}_{before} = \sum m \vec{v}_{after}
$\Delta p = F_{net}\Delta t$	\Delta \vec{p} = {\vec{F}}_{net} \Delta t
$a_c = \frac{v^2}{r}$	a_c = \frac{v^2}{r}
$\omega = \dfrac{\Delta\theta}{t}$	\omega = \dfrac{\Delta \theta}{t}
$F_c = \dfrac{mv^2}{r}$	F_c = \dfrac{m v^2}{r}
$\tau = r_\perp F = rF\sin\theta$	\tau = r_{\perp} F = r F \sin \theta
$v = \dfrac{2\pi r}{T}$	v = \dfrac{2 \pi r}{T}
$U = -\dfrac{GMm}{r}$	U = -\dfrac{G M m}{r}
$F = \dfrac{GMm}{r^2}$	F = \dfrac{G M m}{r^2}
$\dfrac{r^3}{T^2} = \dfrac{GM}{4\pi^2}$	\dfrac{r^3}{T^2} = \dfrac{G M}{4 \pi^2}

Waves and thermodynamics

Equation	Latex
$v = f\lambda$	v = f \lambda

$f = \frac{1}{t}$	f = \frac{1}{t}
$f_{beat} = \| f_2 - f_1 \|$	f_{beat}= | f_2 - f_1 |
$f' = f \dfrac{(v_{wave} + v_{observer})}{(v_{wave} + v_{source})}$	f' = f \dfrac{(v_{wave} + v_{observer})}{(v_{wave} + v_{source})}
$d \sin \theta = m \lambda$	d \sin \theta = m \lambda
$n_1 \sin \theta_1 = n_2 \sin \theta_2$	n_1 \sin \theta_1 = n_2 \sin \theta_2
$n_x = \dfrac{c}{v_x}$	n_x = \dfrac{c}{v_x}
$I = I_{max} \cos^2 \theta$	I = I_{max} \cos^2 \theta
$\sin \theta_c = \dfrac{n_2}{n_1}$	\sin \theta_c = \dfrac{n_2}{n_1}
$I_1 r^2_1 = I_2 r^2_2$	I_1 r^2_1 = I_2 r^2_2
$Q = m c \Delta T$	Q = m c \Delta T
$\dfrac{Q}{t} = \dfrac{k A \Delta T}{d}$	\dfrac{Q}{t} = \dfrac{k A \Delta T}{d}

Electricity and magnetism

Equation	Latex
$E = \frac{V}{d}$	E = \frac{V}{d}
$F = qE$	\vec{F} = q \vec{E}
$V = \dfrac{\Delta U}{q}$	V = \dfrac{\Delta U}{q}
$F = \dfrac{1}{4 \pi \epsilon_0} \dfrac{q_1 q_2}{r^2}$	F = \dfrac{1}{4 \pi \epsilon_0} \dfrac{q_1 q_2}{r^2}
$W = qV$	W = q V
$W = qEd$	W = q E d
$I = \dfrac{q}{t}$	I = \dfrac{q}{t}
$V = IR$	V = I R
$P = IV$	P = I V
$B = \dfrac{\mu_0 I}{2 \pi r}$	B = \dfrac{\mu_0 I}{2 \pi r}
$B = \dfrac{\mu_0 N I}{L}$	B = \dfrac{\mu_0 N I}{L}
$F = q v_\perp B = q v B \sin \theta$	F = q v_\perp B = q v B \sin \theta
$F = l I_\perp B = l I B \sin \theta$	F = l I_\perp B = l I B \sin \theta
$\dfrac{F}{l} = \dfrac{\mu_0}{2 \pi} \frac{I_1 I_2}{r}$	\dfrac{F}{l} = \dfrac{\mu_0}{2 \pi} \frac{I_1 I_2}{r}
$\Phi = B_\parallel A = B A \cos \theta$	\Phi = B_\parallel A = B A \cos \theta
$\epsilon = - N \dfrac{\Delta \Phi}{\Delta t}$	\epsilon = - N \dfrac{\Delta \Phi}{\Delta t}
$\tau = n I A_\perp B = n I A B \sin \theta$	\tau = n I A_\perp B = n I A B \sin \theta
$\dfrac{V_p}{V_s} = \dfrac{N_p}{N_s}$	\dfrac{V_p}{V_s} = \dfrac{N_p}{N_s}
$V_p I_p = V_s I_s$	V_p I_p = V_s I_s

Quantum, special relativity and nuclear

Equation	Latex
$\lambda = \frac{h}{mv}$	\lambda = \frac{h}{m v}
$t = \dfrac{t_0}{(1 - \frac{v^2}{c^2})}$	t = \dfrac{t_0}{\sqrt{\Big(1 - \frac{v^2}{c^2}\Big)}}
$l = l_0 \quad (1 - \frac{v^2}{c^2})$	l = l_0 {\sqrt{\Big(1 - \frac{v^2}{c^2}\Big)}}
$p_v = \dfrac{m_0 v}{(1 - \frac{v^2}{c^2})}$	p_v = \dfrac{m_0 v}{\sqrt{\Big(1 - \frac{v^2}{c^2}\Big)}}
$K_{max} = hf - \phi$	K_{max} = h f - \phi
$\lambda_{max} = \frac{t}{T}$	\lambda_{max} = \frac{t}{T}
$E = mc^2$	E = m c^2
$E = hf$	E = h f
$\dfrac{1}{\lambda} = R(\frac{1}{n_f^2} - \frac{1}{n_i^2})$	\dfrac{1}{\lambda} = R \Big(\frac{1}{n^2_f} - \frac{1}{n^2_i} \Big)
$N_t = N_0 e^{-\lambda t}$	N_t = N_0 e^{- \lambda t}
$\lambda = \dfrac{ln 2}{t_{\frac{1}{2}}}$	\lambda = \dfrac{ln 2}{t_{\frac{1}{2}}}

Year 11

Kinematics and Dynamics

Equation	Latex
$F_{AB} = -F_{BA}$	\vec{F}{AB} = - \vec{F}{BA}
$F_x = F \cos\theta$	F_x = F \cos \theta
$F_y = F \sin\theta$	F_y = F \sin \theta
$f_{friction} = \mu F_N$	\vec{f}_{friction} = \mu \vec{F}_N
$P = \frac{\Delta E}{\Delta t}$	P = \frac{\Delta E}{\Delta t}
$P = F_{\parallel} v = F v \cos\theta$	P = F_\parallel v = F v \cos \theta

Electricity and magnetism

Equation	Latex
$\Sigma I = 0$	\Sigma I = 0
$\Sigma V = 0$	\Sigma V = 0
$R_{series} = R_1 + R_2 + ... + R_n$	R_{series} = R_1 + R_2 +... + R_n
$\dfrac{1}{R_{parallel}} = \dfrac{1}{R_1} + \dfrac{1}{R_2} + ... + \dfrac{1}{R_n}$	\dfrac{1}{R_{parallel}} = \dfrac{1}{R_1} + \dfrac{1}{R_2} + ... + \dfrac{1}{R_n}