1 Formula Sheet

Seismic

Velocities	$v_p = \sqrt{\frac{K + 4/3\mu}{\rho}}$	$v_s = \sqrt{\frac{\mu}{\rho}}$
Acoustic impedance	$Z = \rho v$	$R = \frac{Z_2 - Z_1}{Z_2 + Z_1}$ $T = \frac{2Z_2}{Z_2 + Z_1}$
General	$d = vt$	$\lambda = vT = \frac{v}{f}$
Vertical resolution	$L = \frac{\lambda}{4}$	
Refraction arrivals	$t = \frac{x}{v_2} + 2z\frac{\sqrt{v_2^2 - v_1^2}}{v_1 v_2} = \frac{x}{v_2} + t_i$	
Cross-over distance	$x_{cross} = \left(\frac{v_1 v_2}{v_2 - v_1}\right) t_i = 2z\sqrt{\frac{v_2 + v_1}{v_2 - v_1}}$	
Refraction Angles	$\frac{\sin\theta_1}{v_1} = \frac{\sin\theta_2}{v_2}$	
Reflection hyperbola	$t(x)^2 = t_0^2 + \frac{x^2}{v^2}$	x=distance from Tx to Rx