

Equation Sheet:

$$p = p_0 + \rho g d$$

$$v_1 A_1 = v_2 A_2$$

$$p_1 + \frac{1}{2} \rho v_1^2 + \rho g y_1 = p_2 + \frac{1}{2} \rho v_2^2 + \rho g y_2$$

$$Y = \frac{\frac{F}{A}}{\frac{\Delta L}{L}}$$

$$B = -\frac{p}{\frac{\Delta V}{V}}$$

$$D(x, t) = A \sin \left[ 2\pi \left( \frac{x}{\lambda} \pm \frac{t}{T} \right) + \phi_0 \right]$$

$$v_{\text{wave}} = f\lambda = \frac{\omega}{k}$$

$$\omega = 2\pi f$$

$$f = \frac{1}{T}$$

$$k = \frac{2\pi}{\lambda}$$

$$v_{\text{wave}} = \sqrt{\frac{T}{\mu}}$$

$$v_{\text{sound}} = \sqrt{\frac{B}{\rho}}$$

$$I = \frac{P}{4\pi r^2}$$

$$f_+ = \frac{f_0}{1 - \frac{v_s}{v}}$$

$$f_- = \frac{f_0}{1 + \frac{v_s}{v}}$$

$$f_+ = \left( 1 + \frac{v_o}{v} \right) f_0$$

$$f_- = \left( 1 - \frac{v_o}{v} \right) f_0$$

$$f = f_0 \frac{1 \pm \frac{v_o}{v}}{1 \mp \frac{v_s}{v}}$$

$$f = f_0 \sqrt{\frac{1 \pm \frac{v}{c}}{1 \mp \frac{v}{c}}}$$

$$\Delta\phi = 2\pi \frac{\Delta r}{\lambda} + \Delta\phi_0$$

$$\Delta\phi = m2\pi \text{ Constructive}$$

$$\Delta\phi = \left( m + \frac{1}{2} \right) 2\pi \text{ Destructive}$$