Equations to Know

$$\omega = 2\pi f \quad f = \frac{\omega}{2\pi} \quad f \text{ in Hertz (Hz)} \quad \omega \text{ in Radians/sec}$$

$$cos(2\pi f_o t) = \frac{e^{j2\pi f_o t} + e^{-j2\pi f_o t}}{2}$$

$$x + jy = re^{j\theta} = r\cos(\theta) + jr\sin(\theta)$$

$$r = \sqrt{x^2 + y^2} \text{ and } \theta = \tan^{-1}(\frac{y}{x})$$

$$e^{j2\pi f_o t} = \cos(2\pi f_o t) + j\sin(2\pi f_o t)$$

$$j = \sqrt{-1} \quad j^2 = -1 \quad j^3 = -j \quad j^4 = 1$$

Useful Trigonometric Identities

$$\cos^2(2\pi f_o t) = \frac{1}{2} + \frac{1}{2}\cos(2\pi 2 f_o t)$$

$$-\cos(2\pi f_o t) = \cos(2\pi f_o t - \pi)$$

$$\sin(2\pi f_o t) = \cos(2\pi f_o t - \frac{\pi}{2})$$