Unit 1 Lesson & Notes: Sinusoidal Functions

- A sinusoidal function is some function of the form

$$f(t) = A\cos(\omega t - \phi),$$

where

A is amplitude;
ω is angular frequency
ϕ is phase lag
$\phi/\omega = \tau$ is the time lag;
$\omega/2\pi = \nu$ is the frequency
$\nu^{-1} = p$ is the period

- Sinusoidal functions satisfy

$$\underbrace{a\cos(\omega t)}_{\text{Regular/cartesian form}} + b\cos(\omega t) = \underbrace{A\cos(\omega t - \phi)}_{\text{amplitude phase form}}$$

Unit 1 Lesson 8 Problems

1: $A = 2$,

$-1 = \cos(2\pi \cdot 1/8 + \phi) \Rightarrow \phi = \frac{-\pi}{4}$

$\omega = \frac{\pi}{4}$

$$f(t) = 2\cos\left(\frac{\pi}{4}t + \frac{\pi}{4}\right)$$

2: ~~Cannot be A, C, or D, since sin and cos have phase lag~~

By solution, new A is equal to $\sqrt{a^2 + b^2} = 2$, $\phi = \arctan\left(\frac{b}{a}\right) = \frac{\pi}{3}$,

thus d