Amplitude-Phase Form of a Sinusoid

Quiz: Amplitude-Phase Form of a Sinusoid.
Put $cos\,(\omega t) + \sqrt{3}\sin(\omega t)$ into amplitude-phase form $A\cos(\omega t - \phi)$?

Choices:

a) $2\cos\left(\omega t - \frac{\pi}{4}\right)$

b) $\sqrt{3}\cos\left(\omega\left(t - \frac{\pi}{3}\right)\right)$

c) $2\cos\left(\omega\left(t - \frac{\pi}{3}\right)\right)$

d) $2\cos\left(\omega t - \frac{\pi}{3}\right)$

e) $\sqrt{3}\cos\left(\omega t - \frac{\pi}{3}\right)$

f) $\sqrt{3}\cos\left(\omega t - \frac{\pi}{4}\right)$

Answer:
The answer is (d) because $A = \sqrt{1^2 + \sqrt{3}^2} = 2$, and $\phi = \tan^{-1}\frac{\sqrt{3}}{1} = \frac{\pi}{3}$.

18.03SC Differential Equations
Fall 2011