a) Write Real part of $\dfrac{e^{i\omega t}}{2+3i}$ in polar and rectangular form.

b) What is the circular frequency, amplitude and phase lag.

c) Sketch part a) v.s. time.

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a) $\dfrac{e^{i\omega t}}{2+3i}$

$= \dfrac{2-3i}{13}(\cos\omega t + i\sin\omega t)$

Real Part: $\dfrac{2}{13}\cos\omega t + \dfrac{3}{13}\sin\omega t$ $\boxed{\text{Rectangular form}}$

$\qquad = \sqrt{\left(\dfrac{2}{13}\right)^2 + \left(\dfrac{3}{13}\right)^2}\cos\left(\omega t - \tan^{-1}\dfrac{3}{2}\right)$
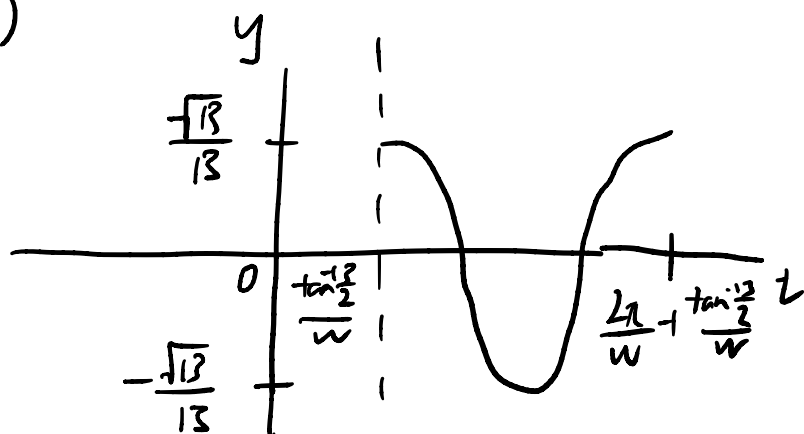
$\qquad = \dfrac{\sqrt{13}}{13}\cos\left(\omega t - \tan^{-1}\dfrac{3}{2}\right)$ $\boxed{\text{Polar form}}$

b) CF: ω

Amplitude: $\dfrac{\sqrt{13}}{13}$

Phase lag: $\dfrac{\tan^{-1}\frac{3}{2}}{\omega}$

c)

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