

1.

$$(1) -10 \quad (2) -1+j \quad (3) -\sqrt{3}+j \quad (4) 0$$

2.

$$(1) \sqrt{2}e^{j\frac{3}{4}\pi} \quad (2) \frac{\sqrt{2}e^{j\frac{1}{4}\pi}}{\sqrt{2}e^{-j\frac{1}{4}\pi}} = e^{j\frac{\pi}{2}}$$

$$(3) \left(2e^{j\frac{5}{3}\pi}\right)^2 = 4e^{j\frac{10}{3}\pi} = 4e^{j\frac{4}{3}\pi} \quad (4) \frac{1}{2e^{j\frac{\pi}{6}}} = \frac{1}{2}e^{-j\frac{\pi}{6}}$$

3.

(1) 加法定理より

$$f(t) = \frac{1}{\sqrt{2}}\sin \omega t + \frac{1}{\sqrt{2}}\cos \omega t = \sin\left(\omega t + \frac{\pi}{4}\right)$$

(2) 加法定理より

$$f(t) = \sin \omega t - \sqrt{3} \cos \omega t = 2\left(\frac{1}{2}\sin \omega t - \frac{\sqrt{3}}{2}\cos \omega t\right) = 2\sin\left(\omega t - \frac{\pi}{3}\right)$$

4.

(1) 加法定理より

$$f(t) = -\frac{1}{2}\sin \omega t + \frac{\sqrt{3}}{2}\cos \omega t = \cos\left(\omega t + \frac{\pi}{6}\right)$$

(2) 加法定理より

$$f(t) = \sqrt{3}\sin \omega t + \cos \omega t = 2\left(\frac{\sqrt{3}}{2}\sin \omega t + \frac{1}{2}\cos \omega t\right) = 2\cos\left(\omega t - \frac{\pi}{3}\right)$$