

1. Phasor addition 방법을 이용하여 다음 두 cosine의 합을 cosine 형태로 나타내시오.

$$x_1(t) = 3\cos(5\pi t + \pi), \quad x_2(t) = 3\sqrt{3}\cos(5\pi t + \frac{3\pi}{2})$$

$$x(t) = x_1(t) + x_2(t)$$

$$= 3\cos(5\pi t + \pi) + 3\sqrt{3}\cos(5\pi t + \frac{3\pi}{2})$$

$$= \operatorname{Re}\{3e^{j(5\pi t + \pi)}\} + \operatorname{Re}\{3\sqrt{3}e^{j(5\pi t + \frac{3\pi}{2})}\}$$

$$= \operatorname{Re}\{3e^{j\pi}e^{5\pi jt}\} + \operatorname{Re}\{3\sqrt{3}e^{j\frac{3\pi}{2}}e^{5\pi jt}\}$$

$$= \operatorname{Re}\{(3e^{j\pi} + 3\sqrt{3}e^{j\frac{3\pi}{2}})e^{5\pi jt}\}$$

$$= \operatorname{Re}\{6e^{j\frac{4\pi}{3}}e^{5\pi jt}\}$$

$$= 6\cos(5\pi t + \frac{4\pi}{3})$$

