

$$c) \frac{(4+4j)}{(2-2j)} = \frac{4+4j}{2-2j} \cdot \frac{2(2+j)}{2(2+j)} = \frac{2(2+j)}{2(1-j)} \quad \leftarrow \text{atan}(1) = \frac{\pi}{4}$$

$$\text{atan}(-1) = \frac{3\pi}{4}$$

$$\frac{2+2j}{1-j} = \frac{2 \cos \theta + j \sin \theta}{\cos \theta - j \sin \theta} = \frac{2\sqrt{2} e^{j\frac{\pi}{4}}}{\sqrt{2} e^{-j\frac{3\pi}{4}}} =$$

8c

$$2 e^{j\frac{\pi}{4}} \cdot e^{-j\frac{3\pi}{4}} = \boxed{2 e^{j\frac{\pi}{2}}}$$

$$3 \quad \frac{d^2 y}{dt^2} + 5 \frac{dy}{dt} + 4y = 0 \quad y(0) = 0 \quad \frac{dy}{dt}(0) = 3$$

m = y

$$m^2 + 5m + 4 = 0$$

$$m = \frac{-5 \pm \sqrt{5^2 - 4(4)}}{2} = \frac{-5 \pm \sqrt{25 - 16}}{2} = \frac{-5 \pm 3}{2}$$

$$m = -4, -1$$

$$y = C_1 e^{-4t} + C_2 e^{-t}$$

$$0 = C_1 + C_2 \quad C_1 = -C_2$$

$$\frac{dy}{dt} = -4C_1 e^{-4t} - C_2 e^{-t}$$

$$\frac{dy}{dt}(0) = 3 = -4C_1 e^{4(0)} - C_2 e^0$$

$$3 = -4C_1$$

$$C_1 = -\frac{3}{4}$$

$$C_2 = \frac{3}{4}$$

$$\boxed{y = \frac{3}{4} e^{-t} - \frac{3}{4} e^{-4t}}$$