

Recitation 4 Answers

$$1. \text{ a,b,c. } e^{it} = 1 + it + \frac{(it)^2}{2!} + \frac{(it)^3}{3!} + \frac{(it)^4}{4!} + \frac{(it)^5}{5!} + \dots = \left(1 - \frac{t^2}{2!} + \frac{t^4}{4!} - \dots\right) + i\left(t - \frac{t^3}{3!} + \frac{t^5}{5!} - \dots\right)$$

$$= \cos t + i \sin t$$

$$d. e^{-it} = \cos t - i \sin t$$

$$2 \text{ a. } \cos t = \frac{e^{it} + e^{-it}}{2} \quad \sin t = \frac{e^{it} - e^{-it}}{2i}$$

$$b. \cos(iy) = \frac{e^{-y} + e^y}{2} \quad \sin(iy) = \frac{e^{-y} - e^y}{2i}$$

$$c. \cos(iy) = \cosh y \quad \sin(iy) = i \sinh y$$

$$d. -\frac{3}{4i} = \frac{3i}{4}$$

$$3. \sin(2 + 3i) = \sin 2 \cos(3i) + \cos 2 \sin(3i) = 9.154 - 4.169i$$