Problem 2.11

Given equation is $\Re\{(1+j)e^{j\theta}\} = -1$. Required to solve for θ.

Expressing complex number $(1+j)$ in terms of complex exponential polar form yields $\sqrt{2}e^{j\frac{\pi}{4}}$.

Hence the equation can be rewritten as, $\Re\{\sqrt{2}e^{j\frac{\pi}{4}}e^{j\theta}\}$ = -1.

The real part of a complex exponential polar form is the cosine function. Thus $\Re\{\sqrt{2}e^{j(\frac{\pi}{4}+\theta)}\} = \sqrt{2}cos(\theta+\frac{\pi}{4})$ = -1.

$cos(\theta+\frac{\pi}{4}) = \frac{-1}{\sqrt{2}}$ implies that $(\theta+\frac{\pi}{4}) = \frac{3\pi}{4}$ or $\frac{-3\pi}{4}$.

Thus, $\theta = \frac{\pi}{2}$ radians or $\theta = -\pi$ radians.