**Solution** (#26)

- $\cos\alpha - i\sin\alpha = 1\left(\cos(-\alpha) + i\sin(-\alpha)\right)$, so this has modulus 1 and argument $-\alpha$ or $2\pi - \alpha$ to put the answer in our preferred range.

- $\sin\alpha - i\cos\alpha = -i\left(\cos\alpha + i\sin\alpha\right)$, so this has modulus 1 and argument $\alpha - \pi/2$ or rather $\alpha + 3\pi/2$ to put the answer in our preferred range.

- $1 + i\tan\alpha = \sec\alpha\left(\cos\alpha + i\sin\alpha\right)$ and so the modulus is $\sec\alpha$ and the argument is $\alpha$.

- $|1 + \cos\alpha + i\sin\alpha| = \sqrt{(1+\cos\alpha)^2 + \sin^2\alpha} = \sqrt{2 + 2\cos\alpha} = \sqrt{4\cos^2(\alpha/2)} = 2\cos(\alpha/2)$. The argument is
$$\tan^{-1}\left(\frac{\sin\alpha}{1+\cos\alpha}\right) = \tan^{-1}\left(\frac{2\sin\frac{\alpha}{2}\cos\frac{\alpha}{2}}{2\cos^2\frac{\alpha}{2}}\right) = \frac{\alpha}{2}.$$