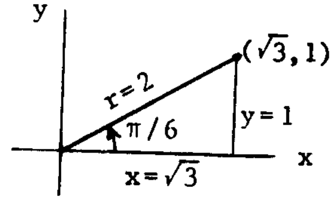
2-4.11.

We plot the point with polar coordinates $r = 2$, $\theta = \pi/6$, and find

$$x = r\cos\theta = 2\cos\frac{\pi}{6} = \sqrt{3},$$

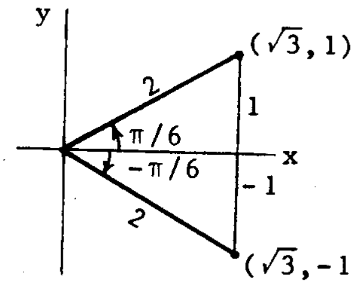
$$y = r\sin\theta = 2\sin\frac{\pi}{6} = 1.$$



The five ways of labeling the point are:
$(\sqrt{3},1)$, $\sqrt{3}+i$, $(2,\pi/6)$, $2\left(\cos\frac{\pi}{6}+i\sin\frac{\pi}{6}\right)$, $2e^{i\pi/6}$.

The complex conjugate of $\sqrt{3}+i$ is $\sqrt{3}-i$. Or, in polar form, the complex conjugate of $2\left(\cos\frac{\pi}{6}+i\sin\frac{\pi}{6}\right)$ is

$$2\left(\cos\frac{\pi}{6}-i\sin\frac{\pi}{6}\right) = 2\left[\cos\left(-\frac{\pi}{6}\right)+i\sin\left(-\frac{\pi}{6}\right)\right].$$



Thus taking the complex conjugate of a number in polar form does not change r but replaces θ by $-\theta$ (see sketch). We see this easily in the $re^{i\theta}$ form; the complex conjugate of $2e^{i\pi/6}$ is $2e^{-i\pi/6}$.

2-4.20.

We write $7(\cos 110° - i\sin 110°) = 7[\cos(-110°) + i\sin(-110°)]$, and plot the point $r = 7$, $\theta = -110° = -1.92$ radians. Using a calculator, we find $x = 7\cos 110° = -2.39$, $y = -7\sin 110° = -6.58$. The point may be labeled: $(-2.39,-6.58)$, $-2.39 - 6.58i$, $(7,-110°)$, $7(\cos 110° - i\sin 110°) = 7(\cos 1.92 - i\sin 1.92)$, $e^{-1.92i}$.