Problem 9. *Compute exact answers for the following expressions:*

a) $\cos(\frac{7\pi}{12})$

b) $\tan(105°)$

c) $\sin(\pi/12)$

b) $\tan 105° = \frac{1-\cos(210°)}{\sin(210°)} = \frac{1+\frac{\sqrt{3}}{2}}{-\frac{1}{2}} = \left(1+\frac{\sqrt{3}}{2}\right)(-2)$

$105° = \frac{210°}{2}$

$= -2-\sqrt{3}$

a) $= \cos\left(\frac{7\pi}{12}\right) = -\sqrt{\frac{1+\cos\left(\frac{7\pi}{6}\right)}{2}} = -\sqrt{\frac{1-\frac{\sqrt{3}}{2}}{2}}$

$\frac{7\pi}{12}$ in QII

$= -\sqrt{\frac{\frac{2-\sqrt{3}}{2}}{2}} = -\sqrt{\frac{2-\sqrt{3}}{4}} = \frac{-\sqrt{2-\sqrt{3}}}{\sqrt{4}}$

$= -\frac{\sqrt{2-\sqrt{3}}}{2}$

c) $\frac{\pi}{12}$ is half of $\frac{\pi}{6}$ $\frac{\pi}{12}$ is in QI.

$\sin\left(\frac{\pi}{6}\right) = \sqrt{\frac{1-\cos\frac{\pi}{6}}{2}} = \sqrt{\frac{2-\sqrt{3}}{2}} = \frac{\sqrt{2-\sqrt{3}}}{2}$