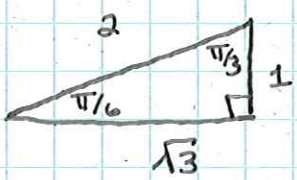
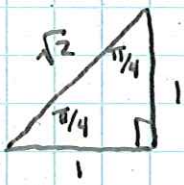
HW 31 Solutions

6.4.18 Evaluate $$\frac{\sin^2\frac{\pi}{3}+\cos^2\frac{\pi}{6}}{\sec^2\frac{\pi}{4}}$$





$$= \frac{3/4+3/4}{2} = \frac{6}{4}\cdot\frac{1}{2} = \boxed{\frac{3}{4}}$$

$$\sin\frac{\pi}{3}=\frac{\sqrt{3}}{2} \qquad \cos\frac{\pi}{6}=\frac{\sqrt{3}}{2} \qquad \sec\frac{\pi}{4}=\sqrt{2}$$

6.4.26 Solve $$\tan\frac{5\pi}{12}\left(\frac{1}{\cos^2\frac{5\pi}{12}}-\frac{1}{\cot^2\frac{5\pi}{12}}\right)-\tan\frac{5\pi}{12}$$

$$= \tan\frac{5\pi}{12}\left(\sec^2\left(\frac{5\pi}{12}\right)-\tan^2\left(\frac{5\pi}{12}\right)\right)-\tan\frac{5\pi}{12}$$

$$\sin^2\theta+\cos^2\theta=1 \rightarrow \frac{\sin^2\theta}{\cos^2\theta}+\frac{1}{\cos^2\theta}=\frac{1}{\cos^2\theta}$$

$$\rightarrow \tan^2\theta+1=\sec^2\theta$$

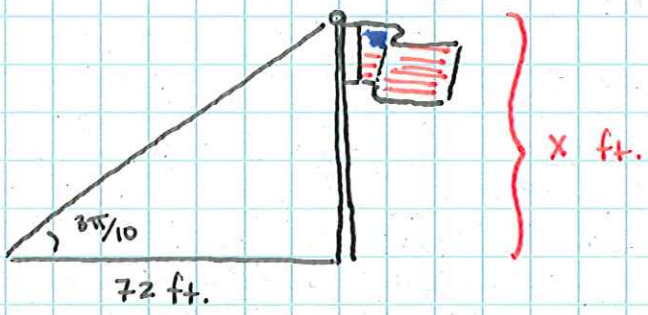
$$1=\sec^2\theta-\tan^2\theta$$

$$= \tan\frac{5\pi}{12}(1)-\tan\frac{5\pi}{12} = \boxed{0}$$

6.4.32 Rewrite $\cos(90°-\theta)\sec\theta$ as one of the six trig functions.

- $\cos(90°-\theta)=\sin(\theta)$
- $\sec\theta=\frac{1}{\cos\theta}$ so ... $\cos(90°-\theta)\sec\theta=\frac{\sin\theta}{\cos\theta}=\boxed{\tan\theta}$

6.4.40

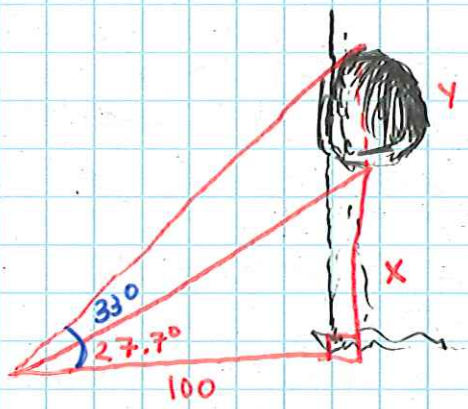


$$\tan\left(\frac{3\pi}{10}\right) = \frac{x}{72}$$

The height of the flag pole is $72\tan\left(\frac{3\pi}{10}\right)$ ft

(or about 99.10 ft.)

6.4.44



$100\tan(27.7) = x$

$100\tan(33°) = x + y$

$y = 100\tan(33°) - 100\tan(27.7°)$

$\approx 64.941 - 52.501 = 12.44$ ft.

The diameter is 12.44 ft.