S2.1 #17

$\sec^4 x - \tan^4 x =$

$= (\sec^2 x)^2 - \tan^4 x$

$= (\tan^2 x + 1)^2 - \tan^4 x$

$= \tan^4 x + 2\tan^2 x + 1 - \tan^4 x$

$= \tan^2 x + \tan^2 x + 1$

$= \tan^2 x + \sec^2 x$

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

$\tan^2 x + 1 = \sec^2 x$

$(a+b)^2 = a^2 + 2ab + b^2$

$(\tan^2 x + 1)^2 = (\tan^2 x)^2 + 2(\tan^2 x)(1) + 1^2$

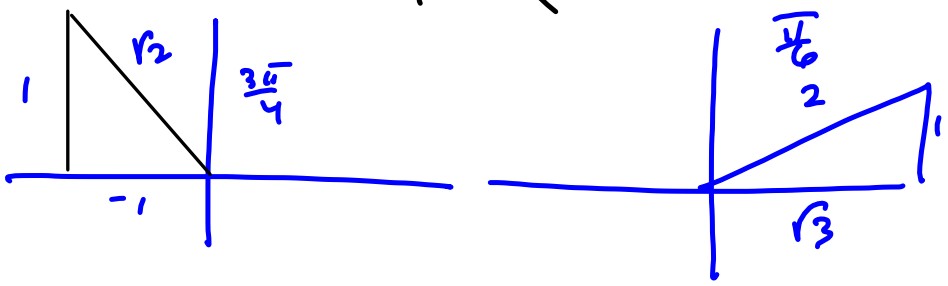
1
1 1
1 2 1
1 3 3 1
1 4 6 4 1

§2.4 #11

$$\frac{11\pi}{12} = \frac{9\pi + 2\pi}{12} = \frac{9\pi}{12} + \frac{2\pi}{12} = \frac{3\pi}{4} + \frac{\pi}{6}$$

$$\sin(a+b) = \sin a \cos b + \sin b \cos a$$

$$= \sin\left(\frac{3\pi}{4}\right)\cos\left(\frac{\pi}{6}\right) + \sin\left(\frac{\pi}{6}\right)\cos\left(\frac{3\pi}{4}\right)$$



$$= \frac{1}{\sqrt{2}} \cdot \frac{\sqrt{3}}{2} + \frac{1}{2} \cdot \frac{-1}{\sqrt{2}} = \frac{\sqrt{3}-1}{2\sqrt{2}} = \sin\frac{11\pi}{12}$$

Go to FIRST problem of a particular type for the most detailed & general info.

$$\cos\left(\frac{11\pi}{12}\right) = \cos\left(\frac{3\pi}{4} + \frac{\pi}{6}\right) = \cos\frac{3\pi}{4}\cos\frac{\pi}{6} - \sin\frac{3\pi}{4}\sin\frac{\pi}{6}$$

$$= \frac{-1}{\sqrt{2}} \cdot \frac{\sqrt{3}}{2} - \frac{1}{\sqrt{2}} \cdot \frac{1}{2} = \frac{-\sqrt{3}-1}{2\sqrt{2}} = \cos\frac{11\pi}{12}$$

$$\tan\frac{11\pi}{12} = \frac{\sin\frac{11\pi}{12}}{\cos\frac{11\pi}{12}} = \frac{\sqrt{3}-1}{2\sqrt{2}} \cdot \frac{2\sqrt{2}}{-\sqrt{3}-1} = \frac{\sqrt{3}-1}{-\sqrt{3}-1} = \tan\frac{11\pi}{12}$$

$$= -\frac{\sqrt{3}-1}{\sqrt{3}+1}$$

8'2.1 II # 10

$\frac{\sin^2 y}{1-\cos y} \cdot \frac{(1+\cos y)}{(1+\cos y)}$ is one way

$\frac{\sin^2 y}{1-\cos y} = \frac{1-\cos^2 y}{1-\cos y} = \frac{(1-\cos y)(1+\cos y)}{1-\cos y}$

$= 1+\cos y$

11) $\frac{6}{\tan x + \sec x}$ from Webassign.

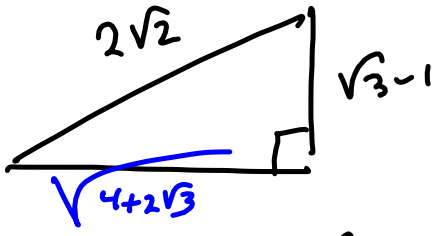
$= \frac{6}{\frac{\sin x}{\cos x} + \frac{1}{\cos x}} = \frac{6}{\frac{\sin x + 1}{\cos x}} = \frac{6}{1} \cdot \frac{\cos x}{\sin x + 1}$

$\frac{6}{\frac{\sin x}{\cos x} + \frac{1}{\cos x}} \cdot \frac{\cos x}{\cos x} = \frac{6\cos x}{\sin x + 1}$

$\frac{\sqrt{3}-1}{2\sqrt{2}} = \sin\frac{11\pi}{12}$

$\cos\frac{11\pi}{12} = \frac{\sqrt{4+2\sqrt{3}}}{2\sqrt{2}} = \frac{\sqrt{2}\sqrt{2+\sqrt{3}}}{2\sqrt{2}}$

$= \frac{\sqrt{2+\sqrt{3}}}{2} = \cos\frac{11\pi}{12}$?



$(2\sqrt{2})^2 - (\sqrt{3}-1)^2 = 4\cdot 2 - (3-2\sqrt{3}+1)$

$= 8 - 4 + 2\sqrt{3}$

$= 4 + 2\sqrt{3}$

$\frac{-\sqrt{3}-1}{2\sqrt{2}} = \cos\frac{4\pi}{12}$