9) $\sin(-x) = -\frac{2}{3}$ $\quad \tan(x) = \frac{-2\sqrt{5}}{5}$

$\sin x = \frac{2}{3}$ $\quad \csc x = \frac{3}{2}$

$opp = 2$ $\quad adj = -\sqrt{5}$ $\quad hyp = 3$

$\cot(x) = \frac{5}{-2\sqrt{5}} = \frac{5\sqrt{5}}{-10} = \frac{-\sqrt{5}}{2} \Rightarrow \frac{adj}{opp}$

$\cos x = \frac{-\sqrt{5}}{3}$ $\quad \sec x = \frac{3}{-\sqrt{5}} = \frac{-3\sqrt{5}}{5}$

14) $\tan\theta$ is undefined $\quad \sin\theta > 0$

opp = 1 $\quad$ adj = 0 $\quad$ hyp = +1

$\tan = \frac{opp}{adj} = \frac{1}{0}$

$1^2 + 0^2 = c^2$

$1^2 = c^2$

$\pm 1 = c$

$\sin\theta = 1$ $\quad$ $\csc\theta = 1$

$\cos\theta = 0$ $\quad$ $\sec\theta = \frac{1}{0} = \text{und.}$

$\tan\theta = \frac{1}{0} = \text{und}$ $\quad$ $\cot\theta = 0$

Pythagorean Identities

$$\sin^2\theta + \cos^2\theta = 1$$

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

$$1 + \cot^2\theta = \csc^2\theta$$

Simplify

$$(\sin x)(\cos^2 x) - \sin x$$

$$(\sin x)(\cos^2 x - 1)$$

$$(\sin x)(-\sin^2 x)$$

$$-\sin^3 x$$

$$\sin^2\theta + \cos^2\theta = 1$$

$$\sin^2\theta = -\cos^2\theta + 1$$

$$\sin^2\theta = 1 - \cos^2\theta$$

$$-\sin^2\theta = \cos^2\theta - 1$$

$$a^m \cdot a^n = a^{m+n}$$

$$(1-\cos^2 x)(\csc x)$$

$$(\sin^2 x)(\csc x)$$

$$(\sin^2 x)\left(\frac{1}{\sin x}\right)$$

$$\frac{\sin^2 x}{\sin x} = \sin x$$

$\sin^2\theta + \cos^2\theta = 1$

$\cdot \cos^2\theta - \cos^2\theta$

$\sin^2\theta = 1 - \cos^2\theta$

$(\sin x)(\cot x)$

$(\sin x)\left(\frac{1}{\tan x}\right)$

$\frac{(\sin x)}{1}\left(\frac{\cos x}{\sin x}\right)$

$\frac{(\sin x)(\cos x)}{\sin x}$

$\cos x$

Verify

$$\frac{\sin x}{1+\cos x} + \frac{\cos x}{\sin x} = \csc x$$

$$\frac{(\sin x)(\sin x) + \cos x(1+\cos x)}{(1+\cos x)(\sin x)}$$

$$\frac{\sin^2 x + \cos x + \cos^2 x}{(1+\cos x)(\sin x)}$$

$$\frac{1+\cos x}{(1+\cos x)(\sin x)} = \frac{1}{\sin x} = \csc x$$

Homework
Pg. 345 #15-20

$$\frac{1(4)}{3(4)} + \frac{3(3)}{4(3)} \rightarrow \frac{}{12}$$