p. 320 # 3b)

$$2\cos^2 x - 3\sin x - 3 = 0$$

$$2(1-\sin^2 x) - 3\sin x - 3 = 0$$

$$2 - 2\sin^2 x - 3\sin x - 3 = 0$$

$$2\sin^2 x + 3\sin x + 1 = 0$$

$$(2\sin x + 1)(\sin x + 1) = 0$$

$$\sin x = -\frac{1}{2}, \quad \sin x = -1$$

$$\boxed{x = \frac{7\pi}{6}, \frac{11\pi}{6}, \frac{3\pi}{2}}$$

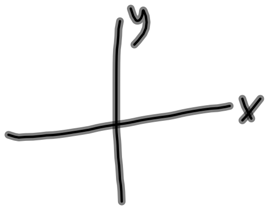
p 321 #8)

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

$$1 - \cos^2 x = \cos^2 x + 1$$

$$0 = 2\cos^2 x$$

$$0 = \cos^2 x$$



$$0 = \cos x$$

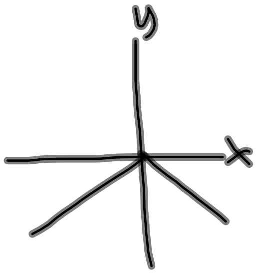
$$\boxed{x = \frac{\pi}{2} \pm \pi n, n \in W}$$

p. 321 #11)

$$\sqrt{3}\cos x \csc x = -2\cos x$$

$$\sqrt{3}\cos x \csc x + 2\cos x = 0$$

$$\cos x\left(\sqrt{3}\csc x + 2\right) = 0$$



$$\cos x = 0, \qquad \csc x = \frac{-2}{\sqrt{3}}$$

$$\downarrow$$

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

$$\boxed{x = \frac{\pi}{2}, \frac{3\pi}{2}, \frac{4\pi}{3}, \frac{5\pi}{3}}$$

p. 314 #1c)

$$\frac{\sin x\cos x - \sin x}{\cos^2 x - 1}$$

$$= \frac{\sin x\,\cancel{(\cos x - 1)}}{(\cos x + 1)\cancel{(\cos x - 1)}}$$

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

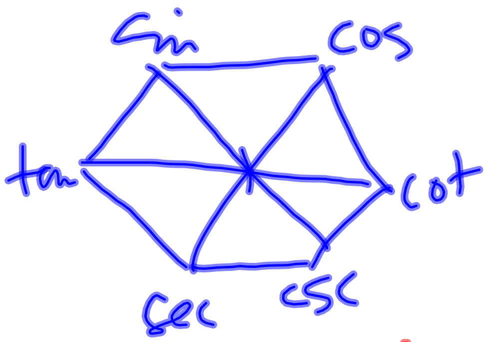
p. 314 #1d) Factor & Simplify:

$$\frac{\tan^2 x - 3\tan x - 4}{\sin x \tan x + \sin x}$$

$$= \frac{(\tan x - 4)\cancel{(\tan x + 1)}}{\sin x\cancel{(\tan x + 1)}}$$

$$= \frac{\tan x - 4}{\sin x}$$

$$= \frac{\tan x}{\sin x} - \frac{4}{\sin x}$$



$$= \boxed{\sec x - 4\csc x}$$

$$\frac{\tan x}{\sin x} = \frac{\frac{\sin x}{\cos x}}{\sin x}$$

$$= \frac{\cancel{\sin x}}{\cos x} \cdot \frac{1}{\cancel{\sin x}}$$

$$= \frac{1}{\cos x}$$

$$= \sec x$$

p.314 #2d) Prove identity using factoring

$$\frac{1-\sin^2 x}{1+2\sin x-3\sin^2 x}=\frac{1+\sin x}{1+3\sin x}$$

LS	RS
$\frac{\cancel{(1-\sin x)}(1+\sin x)}{(1+3\sin x)\cancel{(1-\sin x)}}$	$\frac{1+\sin x}{1+3\sin x}$
$=\frac{1+\sin x}{1+3\sin x}$	

p. 307 # 15) Show each exp. simplifies to $\cos 2x$.

a) $\cos^4 x - \sin^4 x$

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

$= \cos 2x (1)$

$= \cos 2x$

b) $$\frac{\csc^2 x - 2}{\csc^2 x}$$

$$= \frac{\csc^2 x}{\csc^2 x} - \frac{2}{\csc^2 x}$$

$= 1 - 2\sin^2 x$

$= \cos 2x$

p. 306 #5) Simplify to single primary trig. function

b) $\cos 2x \cos x + \sin 2x \sin x$

$= (2\cos^2 x - 1)\cos x + 2\sin x \cos x \cdot \sin x$

$= 2\cos^3 x - \cos x + 2\sin^2 x \cos x$

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

$= \cos x \left(2(\cos^2 x + \sin^2 x) - 1\right)$

$= \cos x(2(1) - 1)$

$= \cos x$

p.306 #5) Simplify to a single primary trig. func.

d) $\dfrac{\cos^3 x}{\cos 2x + \sin^2 x}$

$= \dfrac{\cos^3 x}{1 - 2\sin^2 x + \sin^2 x}$

$= \dfrac{\cos^3 x}{1 - \sin^2 x}$

$= \dfrac{\cos^3 x}{\cos^2 x}$

$= \cos x$

p.306 # 8e) Find exact value.

$$\csc\frac{\pi}{12} = \csc\left(\frac{3\pi}{12} - \frac{2\pi}{12}\right)$$

$\csc 15^\circ$
$= \csc(45^\circ - 30^\circ)$

$$= \csc\left(\frac{\pi}{4} - \frac{\pi}{6}\right)$$

$$= \frac{1}{\sin\left(\frac{\pi}{4} - \frac{\pi}{6}\right)}$$

$$= \frac{1}{\sin\frac{\pi}{4}\cos\frac{\pi}{6} - \sin\frac{\pi}{6}\cos\frac{\pi}{4}}$$

$$= \frac{1}{\frac{\sqrt{2}}{2}\cdot\frac{\sqrt{3}}{2} - \frac{1}{2}\cdot\frac{\sqrt{2}}{2}}$$

$$= \frac{1}{\frac{\sqrt{6}}{4} - \frac{\sqrt{2}}{4}}$$

$$= \frac{1}{\frac{\sqrt{6}-\sqrt{2}}{4}}$$

$$= \frac{4}{\sqrt{6}-\sqrt{2}} \cdot \frac{\sqrt{6}+\sqrt{2}}{\sqrt{6}+\sqrt{2}}$$

$$= \frac{4\sqrt{6}+4\sqrt{2}}{6-2}$$

$$= \frac{4\sqrt{6}+4\sqrt{2}}{4}$$

$$= \boxed{\sqrt{6}+\sqrt{2}}$$

p. 307 #10) Simplify.

$$\cos(\pi + x) + \cos(\pi - x)$$

$$= \cos\pi\cos x - \cancel{\sin\pi\sin x} + \cos\pi\cos x + \cancel{\sin\pi\sin x}$$

$$= (-1)\cos x + (-1)\cos x$$

$$= \boxed{-2\cos x}$$