

$$\begin{aligned}
 7. \quad \cos 2\theta &= 2\cos^2\theta - 1 \\
 &= 2\left(\frac{-12}{13}\right)^2 - 1 \\
 &= 2\left(\frac{144}{169}\right) - 1 \\
 &= \frac{288}{169} - 1 \\
 &= \frac{119}{169}
 \end{aligned}$$

$$b) \sin\left(\frac{\theta}{2}\right)$$

$$\text{since } 1 - 2\sin^2\theta = \cos\theta$$

$$1 - 2\sin^2\left(\frac{\theta}{2}\right) = \cos\theta$$

$$\frac{1 - \cos\theta}{2} = \sin^2\left(\frac{\theta}{2}\right)$$

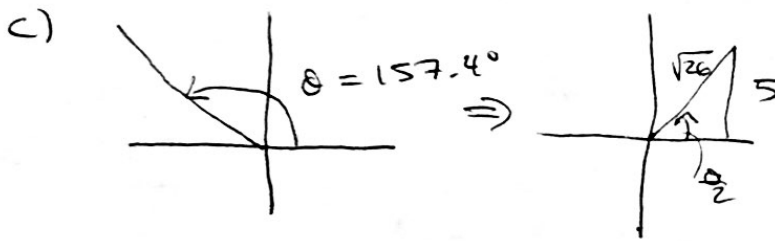
$$\sqrt{\frac{1 - \cos\theta}{2}} = \sin\frac{\theta}{2}$$

$$\sqrt{\frac{1 - \left(\frac{-12}{13}\right)}{2}} = \sin\frac{\theta}{2}$$

$$\sqrt{\frac{25}{26}} = \sin\frac{\theta}{2}$$

$$\frac{5}{\sqrt{26}} = \sin\frac{\theta}{2}$$

$$\frac{5\sqrt{26}}{26} = \sin\frac{\theta}{2}$$



$$8. \quad \csc(x+y) = \frac{1}{\sin(x+y)}$$

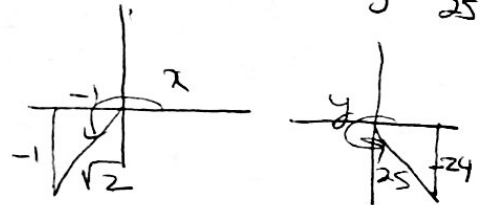
$$\begin{aligned}
 &\sin x \cos y + \cos x \sin y \\
 &= \left(-\frac{1}{\sqrt{2}}\right)\left(\frac{7}{25}\right) + \left(-\frac{1}{\sqrt{2}}\right)\left(-\frac{24}{25}\right) \\
 &= \left(-\frac{\sqrt{2}}{2}\right)\left(\frac{7}{25}\right) + \left(-\frac{\sqrt{2}}{2}\right)\left(-\frac{24}{25}\right)
 \end{aligned}$$

$$= \frac{-7\sqrt{2} + 24\sqrt{2}}{50}$$

$$= \frac{17\sqrt{2}}{50}$$

$$\begin{aligned}
 \Rightarrow \csc(x+y) &= \frac{50}{17\sqrt{2}} \\
 &= \frac{50\sqrt{2}}{34} \\
 &= \frac{25\sqrt{2}}{17}
 \end{aligned}$$

$$\tan x = 1 \quad \sin y = \frac{-24}{25}$$



$$\sin x = -\frac{1}{\sqrt{2}} = \cos x$$

$$\cos y = \frac{7}{25}$$

~~sin~~

SOLUTIONS PRACTICE QUIZ

1. (A) 2. (D)

$$3. \sec\left(\frac{3\pi}{2} + x\right) = \frac{1}{\cos\left(\frac{3\pi}{2} + x\right)} = \frac{1}{-\sin x} = -\csc x$$

$$4. \frac{\sin(x - \pi)}{\cos(x + \pi)} - \cos\left(\frac{\pi}{2} - x\right) \csc(-\pi - x) = \tan x - 1$$

$$LS = \frac{\sin(-(\pi - x))}{\cos(\pi + x)} - \sin x \cdot \frac{1}{\sin(-(\pi + x))}$$

$$= \frac{-\sin(\pi - x)}{-\cos x} - \frac{\sin x}{-\sin(\pi + x)}$$

$$= \frac{\sin x}{\cos x} + \frac{\sin x}{-\sin x}$$

$$= \tan x - 1$$

$$= RS \quad \checkmark$$

$$5. \tan \frac{11\pi}{6} = \tan\left(\frac{3\pi}{2} + \frac{\pi}{6}\right) = -\cot \frac{\pi}{6} = -\frac{1}{\frac{\sqrt{3}}{3}} = -\frac{\sqrt{3}}{3}$$

$$b) \sin 240^\circ = \sin(270^\circ - 30^\circ) = -\cos 30^\circ = -\frac{\sqrt{3}}{2}$$

$$6. \cos\left(-\frac{19\pi}{12}\right) = +\cos\left(\frac{19\pi}{12}\right) = \cos\left(2\pi - \frac{19\pi}{12}\right) = \cos\left(\frac{5\pi}{12}\right)$$

$$\begin{aligned} \Rightarrow \cos\left(\frac{5\pi}{12}\right) &= \cos\left(\frac{\pi}{4} + \frac{\pi}{6}\right) = \cos \frac{\pi}{4} \cos \frac{\pi}{6} - \sin \frac{\pi}{4} \sin \frac{\pi}{6} \\ &= \frac{\sqrt{2}}{2} \left(\frac{\sqrt{3}}{2}\right) - \frac{\sqrt{2}}{2} \left(\frac{1}{2}\right) \\ &= \frac{\sqrt{6}}{4} - \frac{\sqrt{2}}{4} \end{aligned}$$

$$(b) \frac{\tan(69^\circ) - \tan(24^\circ)}{1 - \tan(69^\circ)\tan(24^\circ)}$$

$$= \tan(69^\circ - 24^\circ)$$

$$= \tan 45^\circ$$

$$= 1$$

$$(c) \sin \frac{5\pi}{8}$$

$$\Rightarrow \sin \theta = \sqrt{\frac{1 - \cos 2\theta}{2}}$$

$$\sin \frac{5\pi}{8} = \sqrt{\frac{1 - \cos \frac{5\pi}{4}}{2}}$$

$$= \sqrt{\frac{1 + \frac{\sqrt{2}}{2}}{2}}$$

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