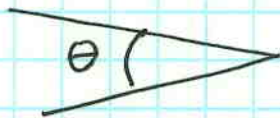


5-5-2 ~~532~~: 28, 31-33, 35, 92-93

352:

28 $\sin \frac{\theta}{2} = \frac{1}{M}$



a) $\pm \sqrt{\frac{1 - \cos \theta}{2}} = \frac{1}{M}$

b) $\cos \theta = \frac{4}{5}$

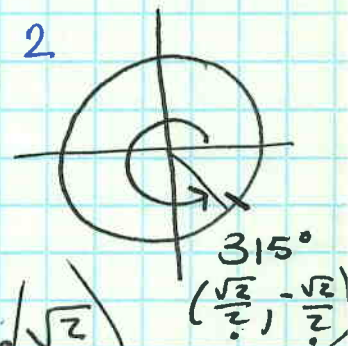
$$\pm \sqrt{\frac{1 - \frac{4}{5}}{2}} = \frac{1}{M} \Rightarrow \sqrt{\frac{\frac{5}{5} - \frac{4}{5}}{2}} \Rightarrow \sqrt{\frac{(\frac{1}{5})}{(\frac{2}{1})}} \Rightarrow \sqrt{\frac{1}{10}}$$

$$\sqrt{\frac{1}{10}} = \frac{1}{M} \quad \sqrt{\frac{1}{10}} = \frac{1}{M} \quad M = \sqrt{10}$$

31. $\tan 157.5^\circ = \tan \left(\frac{315^\circ}{2} \right)$

mult/div by 2

$$\tan \left(\frac{315^\circ}{2} \right) = \frac{1 - \cos \theta}{\sin \theta} = \frac{1 - \cos 315^\circ}{\sin 315^\circ}$$



$$= \frac{1 - \left(\frac{\sqrt{2}}{2} \right)}{-\frac{\sqrt{2}}{2}} = \left(\frac{2 - \sqrt{2}}{2} \right) \left(\frac{-2}{\sqrt{2}} \right) = -\frac{(2 - \sqrt{2})}{\sqrt{2}} \cdot \left(\frac{\sqrt{2}}{\sqrt{2}} \right)$$

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

Check $\tan 157.5^\circ = -0.4142$

$$1 - \sqrt{2} = -0.4142 \dots$$

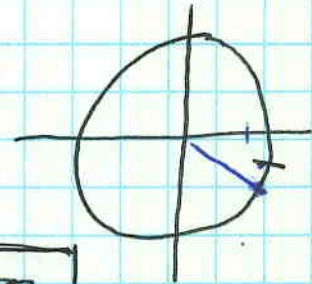
Divide 2 from each term.

$$32 \sin \frac{11\pi}{12} = - \frac{11\pi}{12} = \frac{2 \left(\frac{11\pi}{12} \right) = \left(\frac{22\pi}{12} \right)}{2}$$

$$= \sin \left[\frac{\left(\frac{11\pi}{6} \right)}{2} \right] = \pm \sqrt{\frac{1 - \cos \theta}{2}} \quad \frac{11\pi}{12} \rightarrow \text{QIV} \\ \text{sin neg}$$

$$= - \sqrt{\frac{1 - \cos \left(\frac{11\pi}{6} \right)}{2}} = - \sqrt{\frac{1 - \frac{\sqrt{3}}{2}}{2}}$$

$$= - \sqrt{\frac{\left(\frac{2 - \sqrt{3}}{2} \right)}{\left(\frac{2}{1} \right)}} = - \sqrt{\frac{2 - \sqrt{3}}{4}} = \boxed{\frac{-\sqrt{2 - \sqrt{3}}}{2}}$$



check: $\sin \frac{11\pi}{12} = \sin 315^\circ = -0.2588$

33 $\sin \frac{\theta}{2} + \cos \theta = 1 \quad - \sqrt{\frac{2 - \sqrt{3}}{4}} = -0.2588$

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

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

Isolate the $\sqrt{\quad}$
Square both sides
 \hookrightarrow need to $\sqrt{\quad}$ answers!

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

$$1 - \cos \theta = 2 - 4 \cos \theta + 2 \cos^2 \theta$$

$$0 = 2 \cos^2 \theta - 3 \cos \theta + 2 - 1$$

$$0 = (2 \cos \theta - 1)(\cos \theta - 1)$$

$$2 \cos \theta - 1 = 0 \quad \cos \theta - 1 = 0$$

$$\cos = \frac{1}{2} \quad \cos \theta = 1$$

$$\left[\frac{\pi}{3}, \frac{5\pi}{3} \right], 0$$

Check

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

~~$$\frac{\pi}{6}, \frac{\pi}{3} \quad \frac{1}{2} + \frac{1}{2} = 1$$~~

$$\frac{\pi}{6}, \frac{\pi}{3} \quad \frac{1}{2} + \frac{1}{2} = 1$$

$$\frac{5\pi}{6}, \frac{5\pi}{3} \quad \frac{1}{2} + \frac{1}{2} = 1$$

$$0, 0 \quad 0 + 1 = 1$$

n

$$35. 2 \sin \frac{\theta}{2} = \sin \theta$$

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

Rewrite

$$4 \left(\frac{1 - \cos \theta}{2} \right) = \sin^2 \theta$$

square

$$2(1 - \cos \theta) = 1 - \cos^2 \theta$$

Pythagorean
simplify

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

distribute 2

$$\cos^2 \theta - 1 + 2 - 2 \cos \theta = 0$$

Move to left

$$\cos^2 \theta - 2 \cos \theta + 1 = 0$$

$$(\cos \theta - 1)^2 = 0$$

$$\cos \theta - 1 = 0 \quad (\text{mult. 2})$$

$$\cos \theta = 1 \quad \theta = \cancel{\pi}, 0, \pi \quad \boxed{\theta = 0}$$

$$\text{Check: } 2 \sin \frac{\pi}{2} = \sin \pi$$

$$2(1) = 1 \quad \times$$

$$2 \sin \frac{0}{2} = \sin 0$$

$$2(0) = 0 \quad \checkmark$$

$$92. \frac{\sqrt{6} - \sqrt{2}}{4}$$

$$93. \frac{1}{2}$$