

HW# 5.3-2

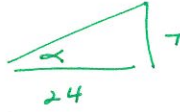
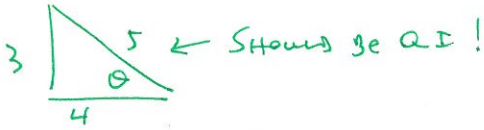
$$\sin \frac{\alpha}{2} = \pm \sqrt{\frac{1 - \cos \alpha}{2}} \quad \cos \frac{\alpha}{2} = \pm \sqrt{\frac{1 + \cos \alpha}{2}} \quad \tan \frac{\alpha}{2} = \frac{1 - \cos \alpha}{\sin \alpha} = \frac{\sin \alpha}{1 + \cos \alpha}$$

use $\frac{1}{2}$ angle to find exact value

(39) $\sin 15^\circ = \frac{\sqrt{2-\sqrt{3}}}{2}$

(43) $\tan 75^\circ = 2 + \sqrt{3}$

(45) $\tan \frac{7\pi}{8} = -\sqrt{2} + 1$

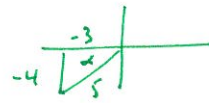


(47) $\sin \frac{\alpha}{2} = \frac{\sqrt{10}}{10}$

(51) $\cos \frac{\alpha}{2} = \frac{7\sqrt{2}}{10}$

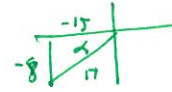
(53) $2 \sin \frac{\theta}{2} \cos \frac{\theta}{2} = \frac{3}{5}$

(55) $\tan \alpha = \frac{4}{3}$, Q III Find $\sin \frac{\alpha}{2} = \frac{2\sqrt{5}}{5}$ + w Q II

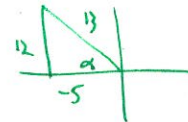


Horizontal line

(56) $\tan \alpha = \frac{8}{15}$, Q III Find $\cos \frac{\alpha}{2} = \frac{-\sqrt{17}}{17}$ + Q II



(57) $\sec \alpha = -\frac{13}{5}$, Q II Find $\tan \frac{\alpha}{2} = \frac{2}{5}$ + Q II



verify

(63)
$$\begin{aligned} \tan \frac{\alpha}{2} &= \frac{\tan \alpha}{\sec \alpha + 1} \\ &= \frac{\frac{\sin \alpha}{\cos \alpha}}{\frac{1}{\cos \alpha} + \frac{\cos \alpha}{\cos \alpha}} \\ &= \frac{\frac{\sin \alpha}{\cos \alpha}}{\frac{1 + \cos \alpha}{\cos \alpha}} \\ &= \tan \frac{\alpha}{2} \end{aligned}$$

(67)
$$\begin{aligned} \tan \frac{\alpha}{2} + \cot \frac{\alpha}{2} &= 2 \csc \alpha \\ \frac{1 - \cos \alpha}{\sin \alpha} + \frac{1 + \cos \alpha}{\sin \alpha} &= \frac{2}{\sin \alpha} \\ &= 2 \csc \alpha \end{aligned}$$

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

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

$$\tan \frac{\alpha}{2} = \frac{1 - \cos \alpha}{\sin \alpha} = \frac{\sin \alpha}{1 + \cos \alpha}$$