

## Warmup 3: Half Angle

Use the half angle identity to find exact value.

1.  $\cos \frac{7\pi}{8}$  ★ S/A  
T/C

$$\cos\left(\frac{7\pi}{8}\right) = -\sqrt{\frac{1+\cos x}{2}}$$

$$-\sqrt{\frac{1+\cos \frac{7\pi}{4}}{2}} = -\sqrt{\frac{1+\sqrt{2}/2}{2}} = -\sqrt{\frac{\frac{2}{2} + \frac{\sqrt{2}}{2}}{2}}$$

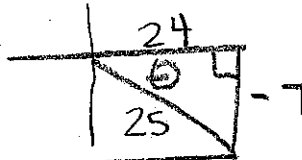
$$-\sqrt{\frac{\frac{2+\sqrt{2}}{2}}{2}} = -\sqrt{\frac{2+\sqrt{2}}{2} \cdot \frac{1}{2}} = -\sqrt{\frac{2+\sqrt{2}}{4}}$$

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

2. Given  $\sin \theta = -\frac{7}{25}$  and  $270^\circ < \theta < 360^\circ$ ,

find  $\cos \frac{\theta}{2}$ .

$135^\circ < \frac{\theta}{2} < 180^\circ$  ★ S/A  
T/C



$$-\sqrt{\frac{1+\cos \theta}{2}} = -\sqrt{\frac{1+24/25}{2}} = -\sqrt{\frac{\frac{25}{25} + \frac{24}{25}}{2}}$$

$$-\sqrt{\frac{\frac{49}{25}}{2}} = -\sqrt{\frac{49}{25} \cdot \frac{1}{2}} = -\frac{\sqrt{49}}{\sqrt{50}} =$$

$$\frac{-7 \cdot \sqrt{2}}{5\sqrt{2} \cdot \sqrt{2}} = \boxed{\frac{-7\sqrt{2}}{10}}$$

5.5.2