

Rewrite $\frac{17\pi}{4}$ as $4\pi + \frac{\pi}{4}$. Now use the identity $\sin(\theta + 2\pi) = \sin \theta$ to simplify the calculation:

$$\sin\left(\frac{17\pi}{4}\right) = \sin\left(4\pi + \frac{\pi}{4}\right) = \sin\left(2\pi + \frac{\pi}{4}\right)$$

$$= \sin\left(\frac{\pi}{4}\right) = \sin(45^\circ) = \frac{\sqrt{2}}{2}$$