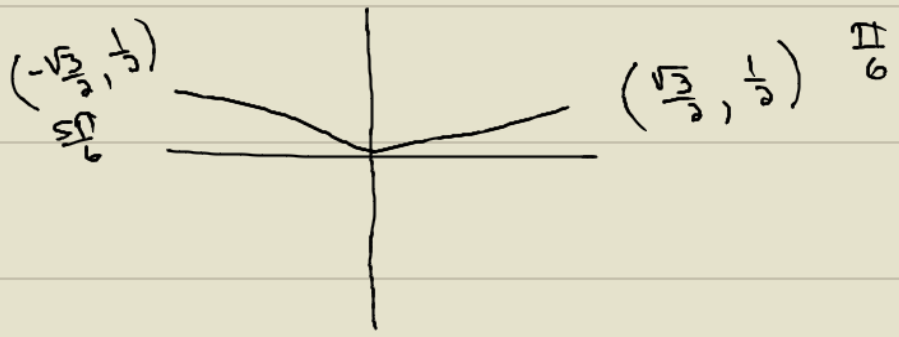
10. $y = 2 + \sin x \quad y = 3 - \sin x$



POI's

$2 + \sin x = 3 - \sin x$

$\sin x + \sin x = 3 - 2$

$2\sin x = 1$

$\sin x = \frac{1}{2}$

$x = \frac{\pi}{6}, \frac{5\pi}{6}$

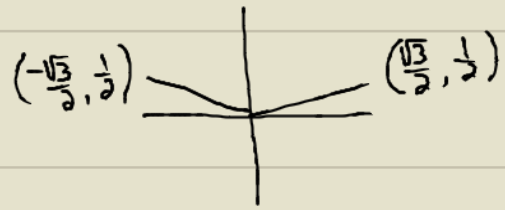
ABOVE: $y = 2 + \sin x$ BELOW: $y = 3 - \sin x$

$$\int_{\frac{\pi}{6}}^{\frac{5\pi}{6}} (2 + \sin x) - (3 - \sin x)\, dx$$

$$= \int_{\frac{\pi}{6}}^{\frac{5\pi}{6}} (2\sin x - 1)\, dx$$

$$= \left[-2\cos x - x\right]_{\frac{\pi}{6}}^{\frac{5\pi}{6}}$$

$$= \left[-2\cos\tfrac{5\pi}{6} - \tfrac{5\pi}{6}\right] - \left[-2\cos\tfrac{\pi}{6} - \tfrac{\pi}{6}\right]$$



$$= \left[-2\left(-\tfrac{\sqrt{3}}{2}\right) - \tfrac{5\pi}{6}\right] - \left[-2\left(\tfrac{\sqrt{3}}{2}\right) - \tfrac{\pi}{6}\right]$$

$$= \sqrt{3} - \tfrac{5\pi}{6} - \left[-\sqrt{3} - \tfrac{\pi}{6}\right]$$

$$= \sqrt{3} - \tfrac{5\pi}{6} + \sqrt{3} + \tfrac{\pi}{6}$$

$$= 2\sqrt{3} - \tfrac{4\pi}{6}$$

$$= 2\sqrt{3} - \tfrac{2\pi}{3}$$

$$\frac{2\sqrt{3}}{1} - \frac{2\pi}{3}$$

$$\frac{6\sqrt{3}}{3} - \frac{2\pi}{3}$$

$$\boxed{\frac{6\sqrt{3} - 2\pi}{3}}$$