

Evaluate the integral $\int_0^{\pi} |\cos(t)| dt$

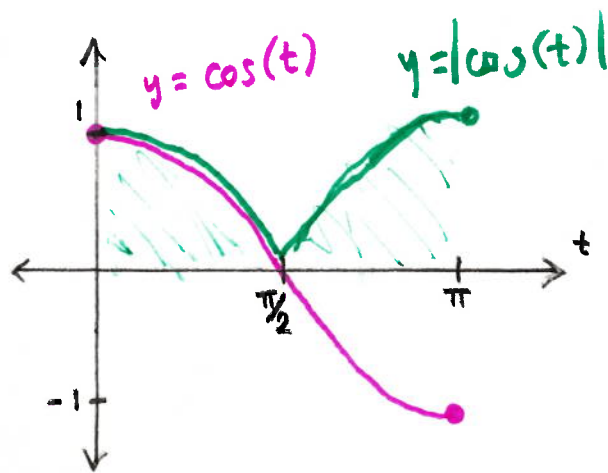
$$\int_0^{\pi} |\cos(t)| dt = \int_0^{\pi/2} \underbrace{|\cos(t)|}_{=\cos(t) \text{ when } t \in [0, \pi/2]} dt + \int_{\pi/2}^{\pi} \underbrace{|\cos(t)|}_{=-\cos(t)} dt$$

$$= \int_0^{\pi/2} \cos(t) dt + \int_{\pi/2}^{\pi} -\cos(t) dt$$

$$\stackrel{\text{FTC I}}{=} \sin(t) \Big|_0^{\pi/2} + (-\sin(t)) \Big|_{\pi/2}^{\pi}$$

$$= \sin(\pi/2) - \sin(0) - \sin(\pi) + \sin(\pi/2)$$

$$= 1 - 0 - 0 + 1 = \boxed{2}$$



Note $\sin(x)$ is an antiderivative of $\cos(x)$
Check $\frac{d}{dx} \sin(x) = \cos(x)$