

Q5 Solution from 4-7 Area under Curves notes

Q5 $f(x) = \cos x$ $-\pi < x < \pi$

$f(0) = \cos 0 = 1$ $(0, 1)$

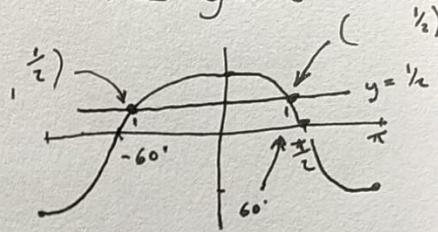
$f(\pi) = \cos \pi = -1$ $(\pi, -1)$

$f(\frac{\pi}{2}) = \cos \frac{\pi}{2} = 0$ $(\frac{\pi}{2}, 0)$

$f(-\frac{\pi}{2}) = \cos(-\frac{\pi}{2}) = \cos(\frac{\pi}{2}) = 0$ $(-\frac{\pi}{2}, 0)$

$f(-\pi) = \cos(-\pi) = \cos(\pi) = -1$ $(-\pi, -1)$

line $y = \frac{1}{2}$

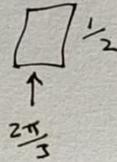
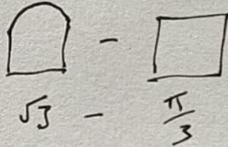


$60^\circ = \frac{\pi}{3}$

$$\int_{-\frac{\pi}{3}}^{\frac{\pi}{3}} \cos x = \left| \sin x + c \right|_{-\frac{\pi}{3}}^{\frac{\pi}{3}} = \left(\sin \frac{\pi}{3} + c \right) - \left(\sin \left(-\frac{\pi}{3} \right) + c \right)$$

$$= \frac{\sqrt{3}}{2} + c - \left(-\frac{\sqrt{3}}{2} \right) - c$$

$$= 2\frac{\sqrt{3}}{2} = \sqrt{3}$$



$\frac{1}{2} \times \frac{2\pi}{3} = \frac{2\pi}{6} = \frac{\pi}{3}$

Area = $\sqrt{3} - \frac{\pi}{3}$ or $\sqrt{3} - 60^\circ$