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5) a)

$$\int_{k}^{\pi/2} \cos x \, dx = \frac{1}{2} \qquad k \ (0 < k < \frac{\pi}{2})$$

$$f = \cos x \, dx$$

$$F = \int \cos x \, dx = \boxed{\operatorname{sen} x + C}$$

$$F\left(\frac{\pi}{2}\right) - F(k) = \frac{1}{2}$$

$$\operatorname{Sen}\left(\frac{\pi}{2}\right) - \operatorname{Sen}(k) = \frac{1}{2}$$

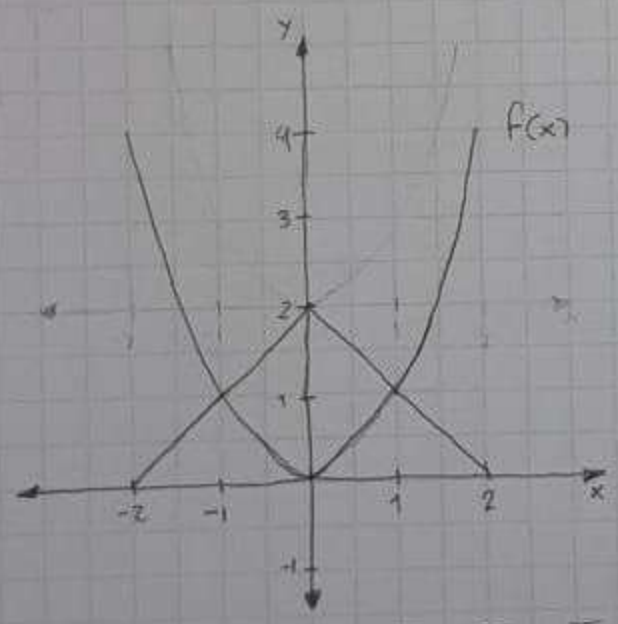
$$1 - \operatorname{Sen}(k) = \frac{1}{2}$$

$$\operatorname{Sen}(k) = \frac{1}{2}$$

$$k = \frac{\pi}{6}$$

Rta: el valor k que cumple es $k = \frac{\pi}{6}$

b)



$$f(x) = x^2$$

$$g(x) = 2 - |x|$$

$$= \int_{-1}^{1} 2 - |x| \; - \int_{-1}^{1} x^2$$

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

$$= \boxed{\frac{7}{3}}$$

Rta: El area encerrada es de 7/3

$$\int_{-1}^{1} 2 - |x| = \int_{-1}^{0} 2 + x \; + \int_{0}^{1} 2 - x$$

$$= F(0) - F(-1) + F_2(1) - F_2(0)$$

$$= 2 \cdot 0 + \frac{0^2}{2} - \left[2(-1) + \frac{(-1)^2}{2}\right] + 2 \cdot 1 - \frac{1^2}{2} - 0 + C$$

$$= + \frac{3}{2} + \frac{3}{2} = \frac{6}{2} = \boxed{3}$$

$$F(x) = 2x + \frac{x^2}{2} + C \qquad F_2(x) = 2x - \frac{x^2}{2} + C$$

$$\int_{-1}^{1} x^2 = F(1) - F(-1)$$

$$= \frac{1^3}{3} - \frac{-1^3}{3} + C - C$$

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

$$F(x) = \frac{x^3}{3} + C$$

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5) c)

	x=0	x=1
f	2	4
g	6	-3
f'	-4	3
g'	2	-1

Si $\int_0^1 f'_{(x)} \cdot g_{(x)}\, dx = 5$

$\int_0^1 f_{(x)} \cdot g'_{(x)}$

$\int u\, dv = uv - \int v\, du$

$\underbrace{f_{(x)}}_{u} \cdot \underbrace{g'_{(x)}}_{dv} = uv - \int v\, du$

$= f_{(x)} \cdot g_{(x)} - \underbrace{\int g_{(x)} \cdot f_{(x)}}_{-5}$

$u = f_{(x)}$
$du = f'_{(x)}$
$dv = g'_{(x)}$
$v = g_{(x)}$

$F_{(1)} - F_{(0)}$

$= [f_{(1)} \cdot g_{(1)} - 5] - [f_{(0)} \cdot g_{(0)} - 5]$

$= [4 \cdot (-3) - 5] - [2 \cdot 6 - 5]$

$= [-12 - 5] - [12 - 5]$

$= -17 - 7$

$\boxed{= -24}$

$\boxed{\int_0^1 f_{(x)} \cdot g'_{(x)} = -24}$