2. $f(x) = x^3 - 4x$

$g(x) = 0$

PoI's

$x^3 - 4x = 0$

$x(x^2 - 4) = 0$

$x(x+2)(x-2) = 0$

$x = 0 \quad x+2 = 0 \quad x-2 = 0$

$x = 0 \quad x = -2 \quad x = 2$

$$\int_{-2}^{0} \underset{A}{(x^3 - 4x)} - \underset{B}{(0)}\, dx + \int_{0}^{2} \underset{A}{(0)} - \underset{B}{(x^3 - 4x)}\, dx$$

$$= \int_{-2}^{0} (x^3 - 4x)\, dx + \int_{0}^{2} (-x^3 + 4x)\, dx$$

$$= \left[\frac{1}{4}x^4 - \frac{4}{2}x^2\right]_{-2}^{0} + \left[-\frac{1}{4}x^4 + \frac{4}{2}x^2\right]_{0}^{2}$$

$$= \left[\frac{1}{4}x^4 - 2x^2\right]_{-2}^{0} + \left[-\frac{1}{4}x^4 + 2x^2\right]_{0}^{2}$$

$$= \left(\frac{1}{4}(0)^4 - 2(0)^2\right) - \left(\frac{1}{4}(-2)^4 - 2(-2)^2\right) + \left(-\frac{1}{4}(2)^4 + 2(2)^2\right) - \left(-\frac{1}{4}(0)^4 + 2(0)^2\right)$$

$$= -(4 - 8) + (-4 + 8)$$

$$= -(-4) + 4$$

$$= 4 + 4$$

$$= \boxed{8}$$