4. $\oint_C \underbrace{(3xy)}_{M}\,dx + \underbrace{(x+y)}_{N}\,dy$

$$= \int_{x=-2}^{x=2} \int_{y=0}^{y=4-x^2} (1-3x)\,dy\,dx$$

$$= \int_{x=-2}^{x=2} \Big[y - 3xy\Big]_{y=0}^{y=4-x^2} dx$$

$$= \int_{x=-2}^{x=2} \Big[4-x^2 - 3x(4-x^2) - \big(0 - 3x(0)\big)\Big]\,dx$$

$$= \int_{x=-2}^{x=2} \Big[4 - x^2 - 12x + 3x^3\Big]\,dx$$

$$= \Big[4x - \tfrac{1}{3}x^3 - \tfrac{12}{2}x^2 + \tfrac{3}{4}x^4\Big]_{x=-2}^{x=2}$$

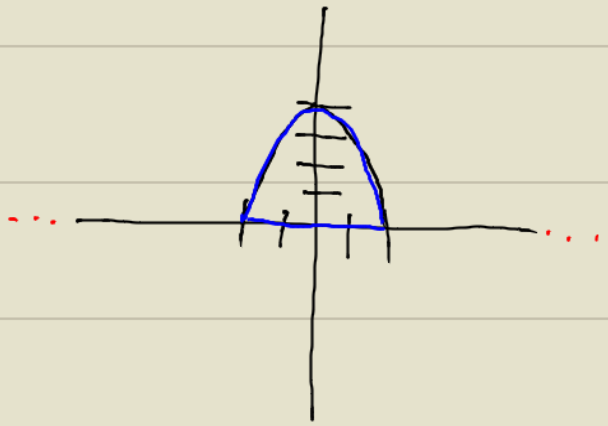
$$= 4(2) - \tfrac{1}{3}(2)^3 - 6(2)^2 + \tfrac{3}{4}(2)^4 - \Big(4(-2) - \tfrac{1}{3}(-2)^3 - 6(-2)^2 + \tfrac{3}{4}(-2)^4\Big)$$

$$= 8 - \tfrac{8}{3} - 24 + 12 - \Big(-8 + \tfrac{8}{3} - 24 + 12\Big)$$

$$= 8 - \tfrac{8}{3} - 24 + 12 + 8 - \tfrac{8}{3} + 24 - 12$$

$$= 16 - \tfrac{16}{3}$$

$$= \boxed{\tfrac{32}{3}}$$



POI's

$4 - x^2 = 0$

$4 = x^2$

$x = \pm\sqrt{4}$

$x = \pm 2$