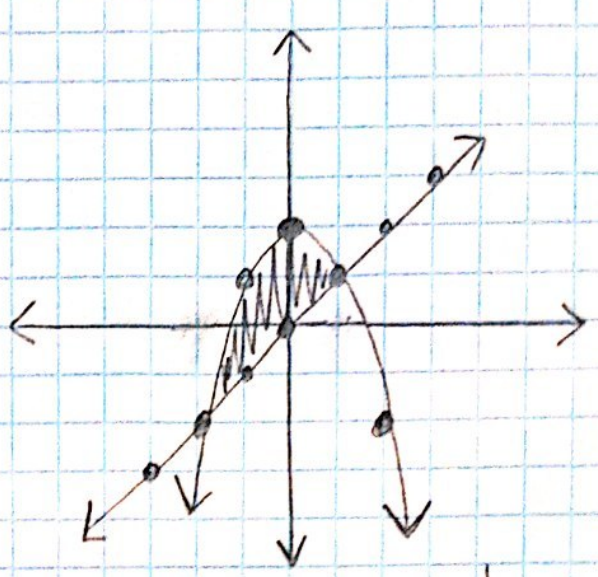
1) Area Between $f(x) = 2 - x^2$ and $g(x) = x$

$2 - x^2 = x$

$x^2 + x - 2 = 0$

$(x+2)(x-1) = 0$

$x = -2, 1$



$$\int_{-2}^{1} [f(x) - g(x)]\,dx$$

$$= \int_{-2}^{1} (2 - x^2 - x)\,dx = 2x - \frac{x^3}{3} - \frac{x^2}{2}\Big|_{-2}^{1}$$

$$= \left(2 - \frac{1}{3} - \frac{1}{2}\right) - \left(-4 + \frac{8}{3} - 2\right)$$

$$\frac{12}{6} - \frac{2}{6} - \frac{3}{6} + \frac{24}{6} - \frac{16}{6} + \frac{12}{6} = \frac{27}{6} = \boxed{\frac{9}{2} \text{ units}^2}$$

2) Area Between: $f(x) = 3x^3 - x^2 - 10x$

$g(x) = -x^2 + 2x \longrightarrow x(-x+2)$

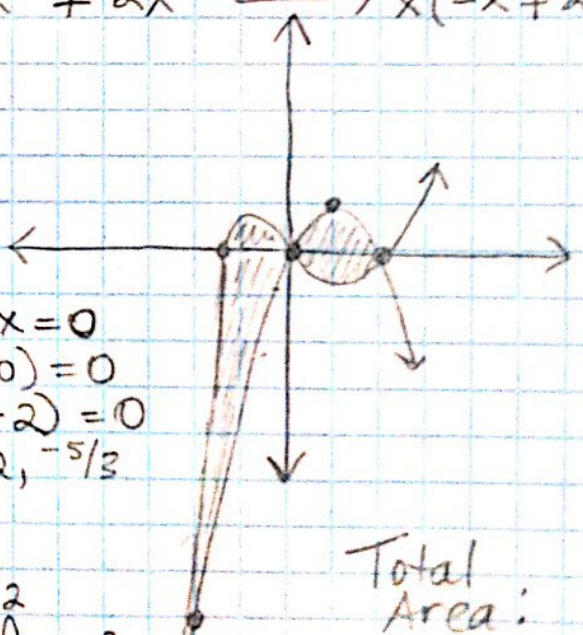
$3x^3 - x^2 - 10x = -x^2 + 2x$

$3x^3 - 12x = 0$

$3x(x^2 - 4) = 0$

$3x(x+2)(x-2) = 0$

$x = 0, -2, 2$



$$\int_{-2}^{0} (3x^3 - x^2 - 10x + x^2 - 2x)\,dx$$

$3x^3 - x^2 - 10x = 0$

$x(3x^2 - x - 10) = 0$

$x(3x+5)(x-2) = 0$

$x = 0, 2, -5/3$

$$= \int_{-2}^{0} (3x^2 - 12x)\,dx = \frac{3}{4}x^4 - 6x^2\Big|_{-2}^{0}$$

$$0 - (12 - 24) = (12)$$

$$\int_{0}^{2} (-x^2 + 2x - 3x^3 + x^2 + 10x)\,dx = \int_{0}^{2} -3x^3 + 12x$$

$$= -\frac{3}{4}x^4 + 6x^2\Big|_{0}^{2} = -12 + 24 = (12)$$

Total Area: $12 + 12 = \boxed{24\ u^2}$

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