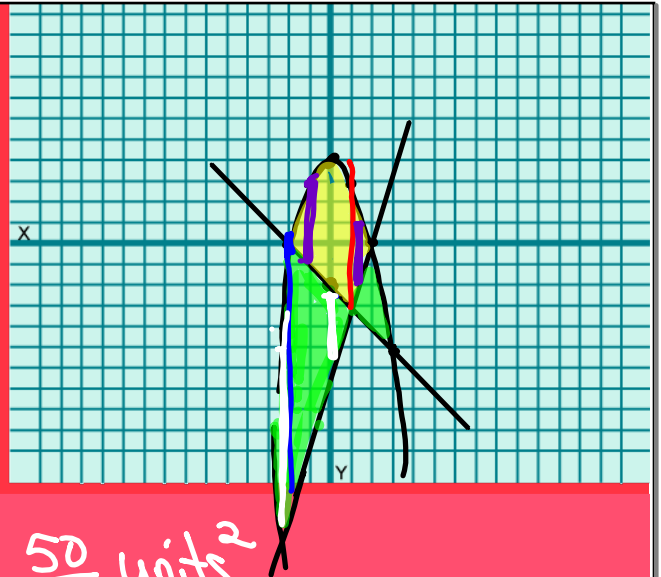# AREA 2

$4-x^2$

Find the area under $y = -x^2 + 4$ and above $y = -x - 2$ and $y = 3x - 6$.

$$\int_{-2}^{1} \left(-x^2 + 4 - (-x - 2) \right) dx$$

$$+ \int_{1}^{2} \left(-x^2 + 4 - (3x - 6) \right) dx = \frac{50}{3} \text{ units}^2$$

Find the area between:
$x + y^2 = 4$ and $x - y = -2$

$x = 4 - y^2 \qquad x + 2 = y$

$R - L \qquad\qquad x = y - 2$

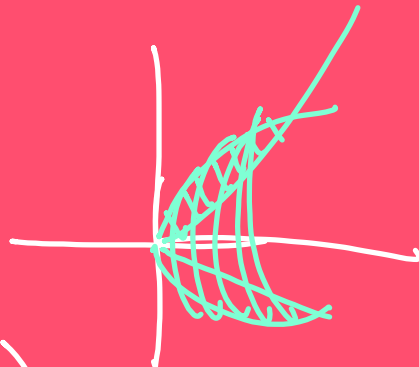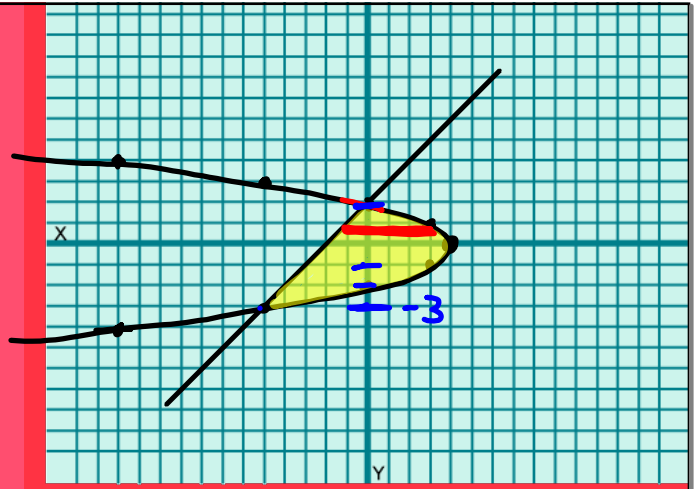$$\int_{-3}^{2} \left[(4 - y^2) + (y + 2) \right] dy$$

$$\int_{-3}^{2} (-y^2 - y + 6) \, dy$$

$$-\frac{y^3}{3} - \frac{y^2}{2} + 6y \ \Big|_{-3}^{2}$$

$$-\frac{8}{3} - 2 + 12 + \left(-9 + \frac{9}{2} + 18 \right)$$

$$19 - \frac{8}{3} + \frac{9}{2}$$

$$\frac{114}{6} - \frac{16}{6} + \frac{27}{6} = \frac{125}{6} \ units^2$$

Find area between
$xy = 1$ and $x + y^2 = 10$.
$x = 10 - y^2$
$y = \dfrac{1}{x}$
$x = -y^2 + 10$
$\rightarrow x = \dfrac{1}{y}$

$$\int_{0.10}^{3.11} \left(-y^2 + 10 - \dfrac{1}{y}\right) dy$$

$X - \dfrac{f(x)}{f'(x)}$
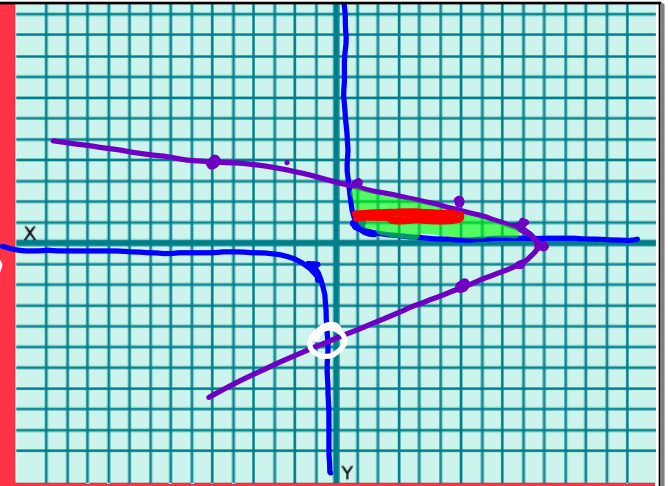
$y\left[\dfrac{1}{y} = -y^2 + 10\right]$

$1 = -y^3 + 10y$

$0 = -y^3 + 10y - 1$

g) $x = y^3 - y$

X

Y