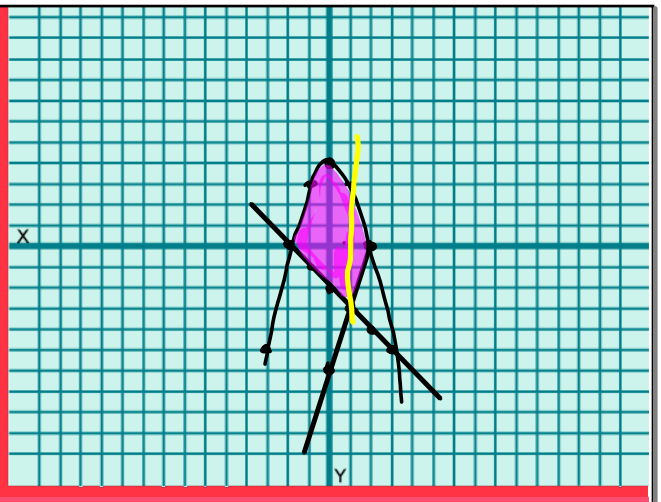
AREA 2

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



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

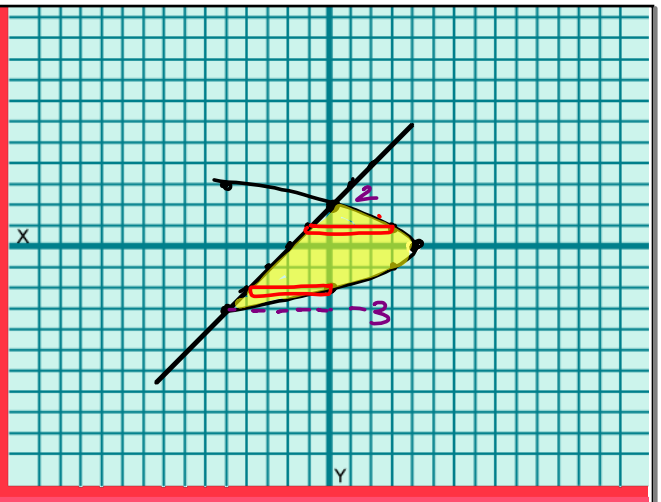
$$+\int_{1}^{2}\left[-x^2+4-(3x-6)\right]dx = \frac{50}{3}\ \text{units}^2$$

Find the area between:

$x + y^2 = 4$ and $x - y = -2$

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

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



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

$$= \frac{125}{6} \text{ units}^2$$

Find area between

$xy=1$ and $x+y^2=10$.

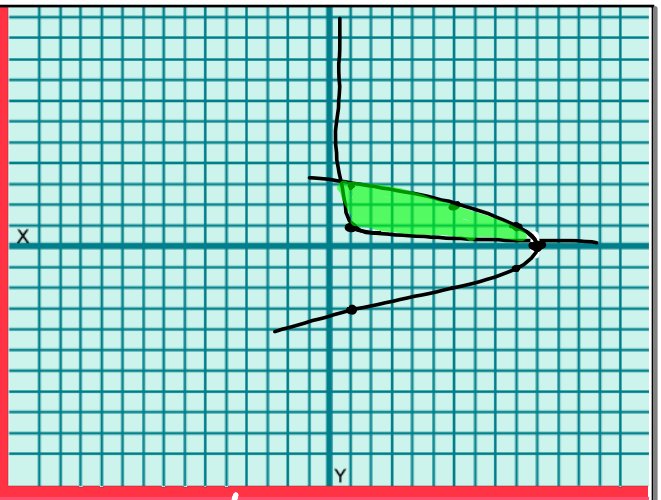
$y=\frac{1}{x}$ $\quad x=-y^2+10$

$x=\frac{1}{y}$

$y\left[\frac{1}{y}=-y^2+10\right]$

$1=-y^3+10y$ ← Solve CAS

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



Graph + intersect

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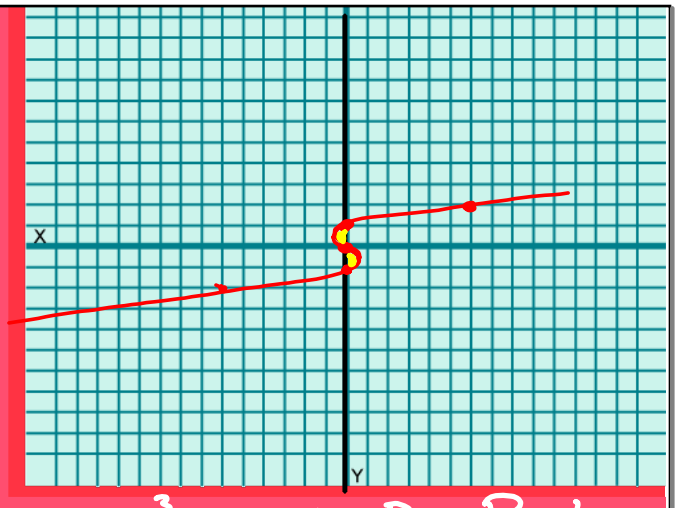
$g(x)$ $x = y^3 - y$

$x = 0$

$y^3 - y$

x	y
0	0
0	1
$8 - 2 = 6$	2
$\frac{1}{8} - \frac{1}{2} = -\frac{3}{8}$	1/2
$-1 + 1 = 0$	-1
$-\frac{1}{8} + \frac{1}{2} = \frac{3}{8}$	-1/2
$-8 + 2 = -6$	-2



$x = y^3 - y$ $x = 0$ R-L

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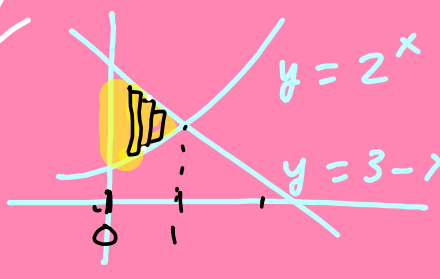

$2^1 = 2$

$2^x = 3 - x$

$3 - 1 = 2$

$$\int_0^1 (3 - x - 2^x)\,dx$$

$$3x - \frac{x^2}{2} - \frac{1}{\ln 2} 2^x \Big|_0^1$$

$$3 - \frac{1}{2} - \frac{1}{\ln 2} \cdot 2 - \left(0 - 0 - \frac{1}{\ln 2} \cdot 1\right)$$

$$= \frac{5}{2} - \frac{2}{\ln 2} + \frac{1}{\ln 2}$$

$$= \frac{5}{2} - \frac{1}{\ln 2}$$