AREA 1

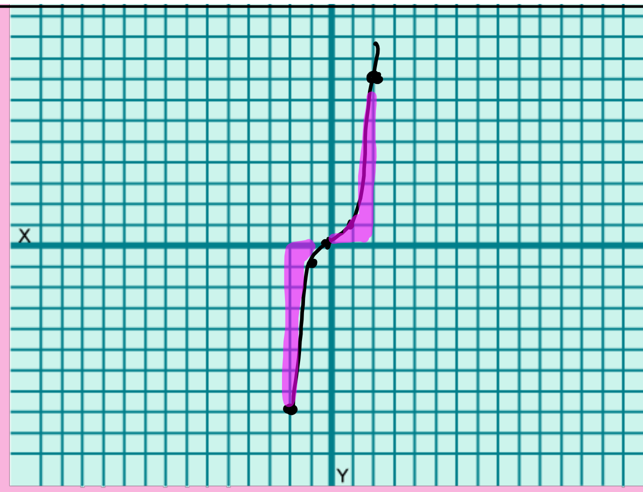
$f(x) = x^3 \quad [-2, 2]$

$\int_{-2}^{2} x^3 \, dx =$

0	0
1	1
2	8

$= \frac{x^4}{4}\Big|_{-2}^{2} = 4 - 4$

$= 0$



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

$= -\frac{x^4}{4}\Big|_{-2}^{0} + \frac{x^4}{4}\Big|_{0}^{2}$

$0 + {}^{+}4 + 4 - 0$

$= 8$ units^2

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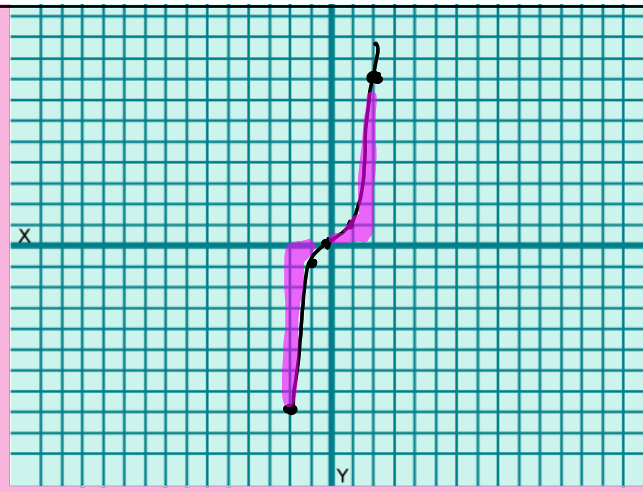

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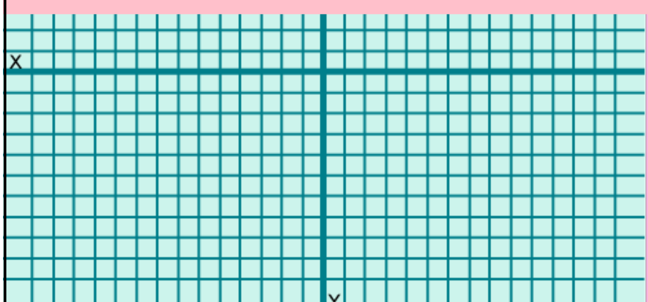
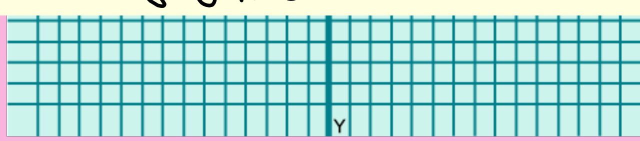




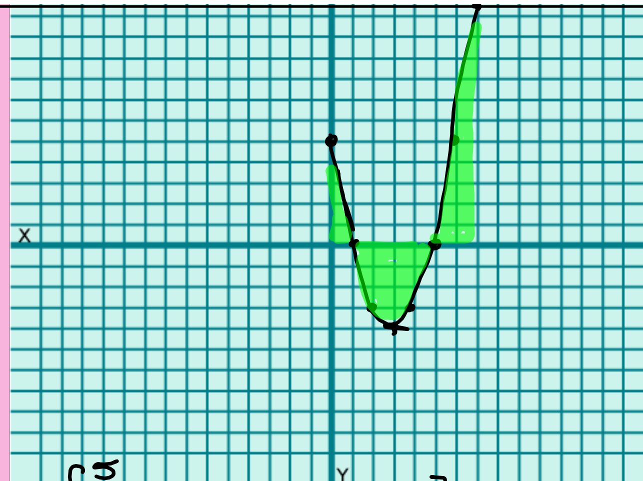
$H(x) = x^2 - 6x + 5 \quad [0, 7]$

Vertx $\left(-\frac{b}{2a}, \text{sub in } x\right)$

$x = \frac{6}{2(1)} = 3 \qquad (3, -4)$

$y = 9 - 18 + 5 = -4$

x	y
0	0
1	1
2	4
3	9

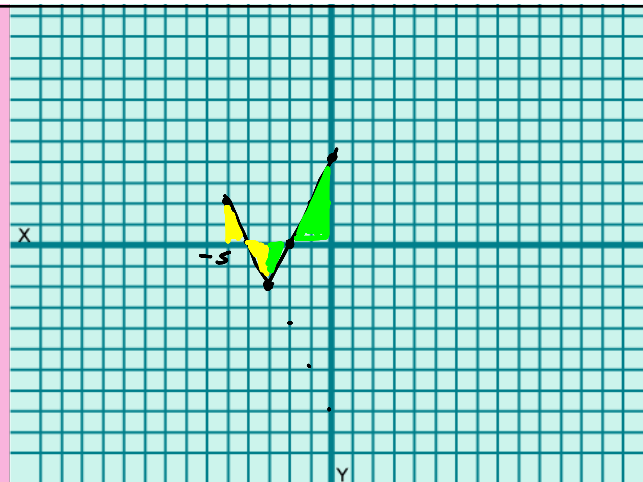


$$\int_0^1 (x^2 - 6x + 5)\,dx - \int_1^5 (x^2 - 6x + 5)\,dx + \int_5^7 (x^2 - 6x + 5)\,dx$$

$$= \frac{71}{3} \text{ units}^2$$

$f(x) = 2|x+3| - 2 \quad [-5, 0]$

Left 3 Down 2



$2(x+3) - 2 = 2x + 6 - 2$
$= 2x + 4$

$-2(x+3) - 2 = -2x - 6 - 2$
$= -2x - 8$

$$\int_{-5}^{-4} (-2x-8)\,dx - \int_{-4}^{-3} (-2x-8)\,dx - \int_{-3}^{-2} (2x+4)\,dx + \int_{-2}^{0} (2x+4)\,dx$$

$$= \boxed{7 \text{ units}^2}$$

$$f(x) = \begin{cases} x^2+4x+3 & -3 \le x \le 0 \\ x-2 & 0 < x < 4 \\ \sqrt{8-x} & 4 \le x \le 8 \end{cases}$$

$[-3, 8]$

$\sqrt{-(x-8)}$

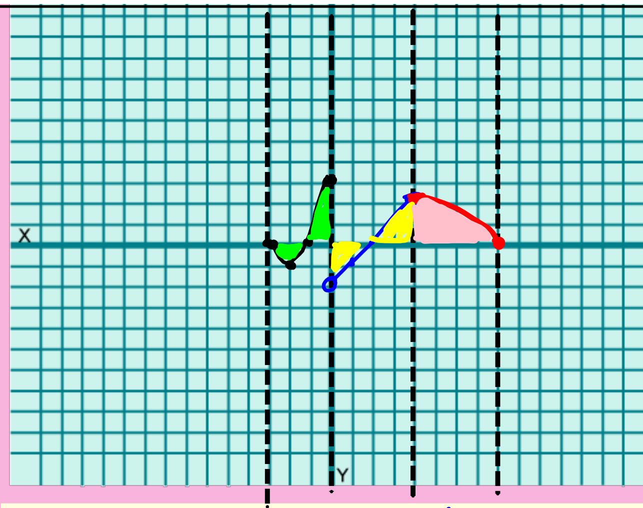
Right 8

0	0
-1	1
-4	2
-9	3

$x = \frac{-b}{2a} = \frac{-4}{2(1)} = -2$

$y = 4 - 8 + 3 = -1$

$y = \sqrt{x}$

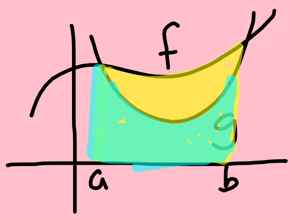


$$-\int_{-3}^{-1}(x^2+4x+3)\,dx + \int_{-1}^{0}(x^2+4x+3)\,dx - \int_0^2 (x-2)\,dx + \int_2^4 (x-2)\,dx + \int_4^8 \sqrt{8-x}\,dx$$

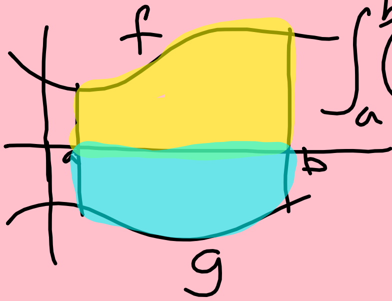
$u = 8-x$

$du = -1\,dx$

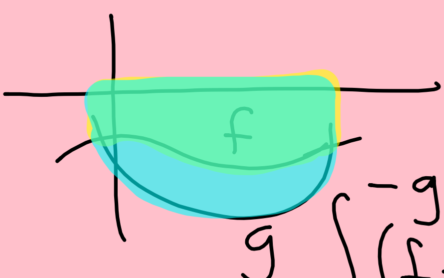
$= \boxed{12 \text{ units}^2}$



$$\int_a^b (f-g)\,dx$$

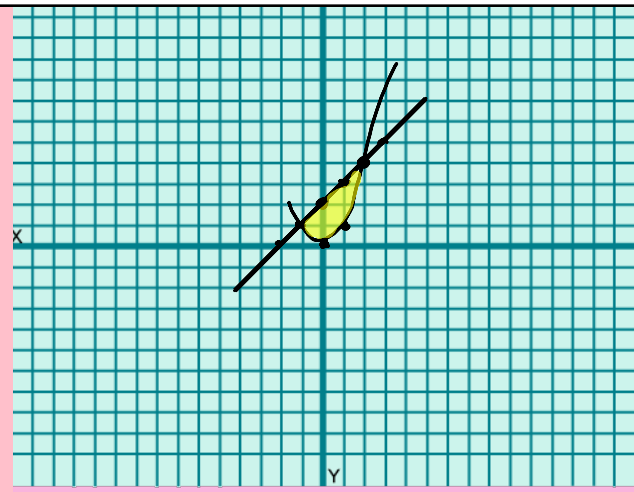


$$\int_a^b (f-g)\,dx$$



$-g+f$

$$\int (f-g)\,dx$$



Find the area between $f(x) = x+2$ & $g(x) = x^2$.

$$\int_{-1}^{2} (x+2-x^2)\,dx$$

$$\frac{x^2}{2} + 2x - \frac{x^3}{3} \Big|_{-1}^{2}$$

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

$$= 8 - 3 - 1/2 = 4\,1/2 \text{ or } \boxed{\frac{9}{2} \text{ units}^2}$$

Always top function − bottom function

February 7, 2022