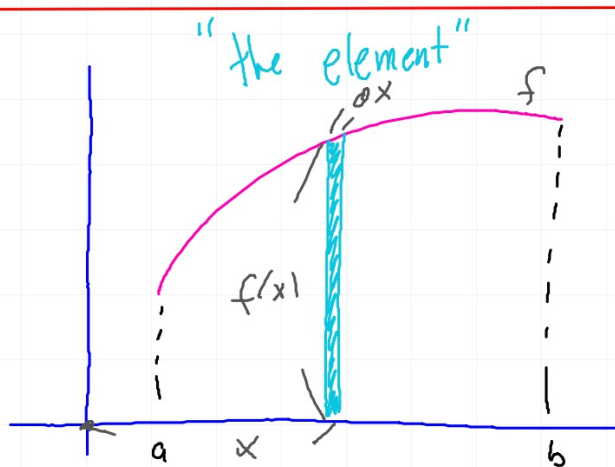
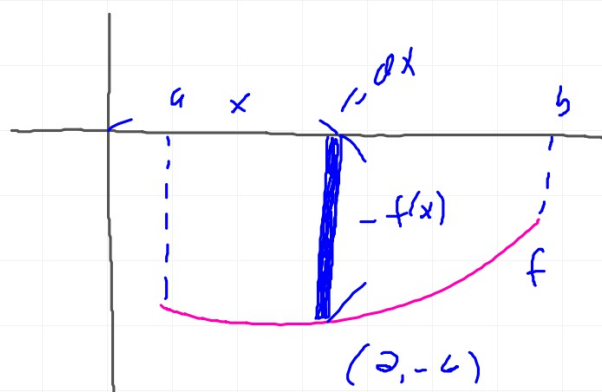


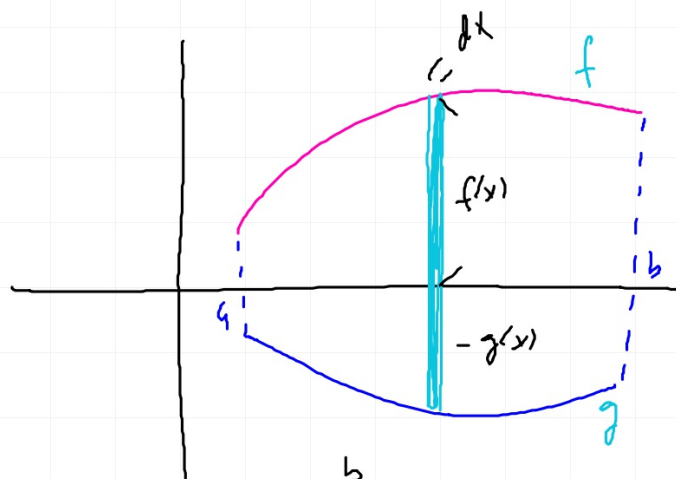
Area Under and Between Curves



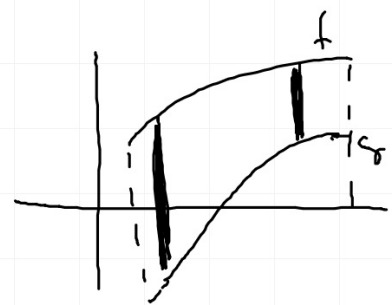
$$A = \int_a^b f(x) dx$$



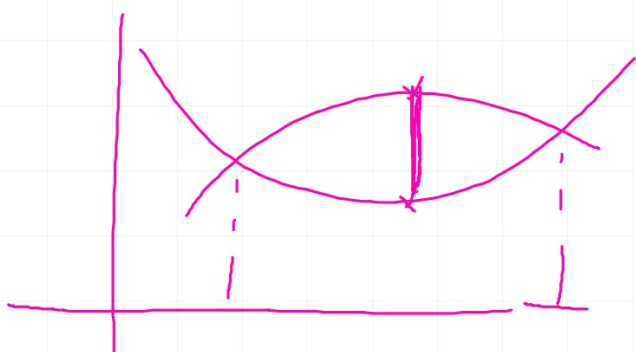
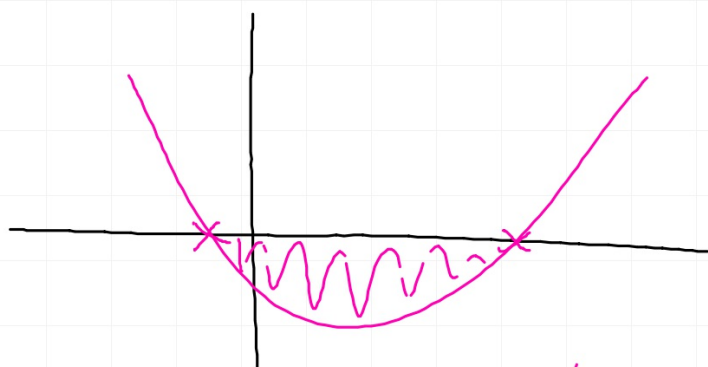
$$A = \int_a^b -f(x) dx = - \int_a^b f(x) dx$$



$$A = \int_a^b [f(x) - g(x)] dx$$



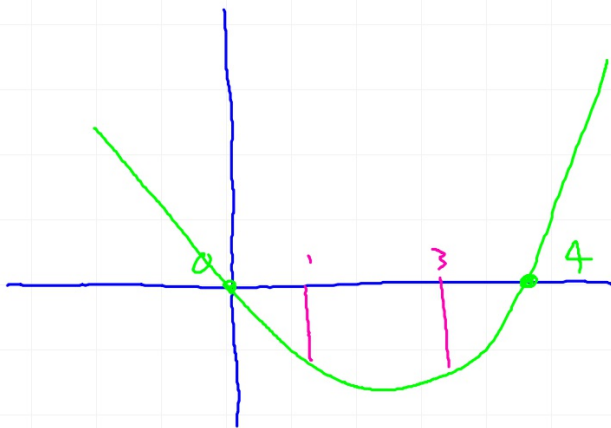
T-B



Bands: $y = x^2 - 4x$, x -axis, $x=1$ and $x=3$

Zeros

$$x^2 - 4x = 0 \Rightarrow x = 0 \text{ or } x = 4$$

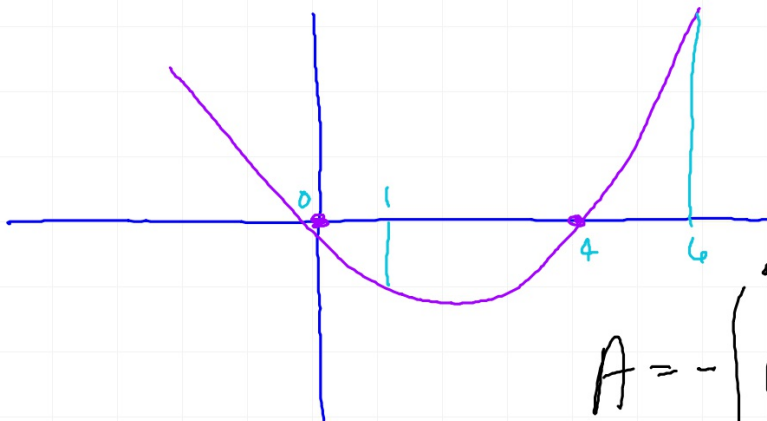


$$\begin{aligned} A &= \int_1^3 -(x^2 - 4x) dx \\ &= - \int_1^3 (x^2 - 4x) dx \end{aligned}$$

Bands: $y = x^2 - 4x$ x axis $x=1$ $x=6$

Zeros

$$x^2 - 4x = 0 \rightarrow x = 0 \text{ or } x = 4$$



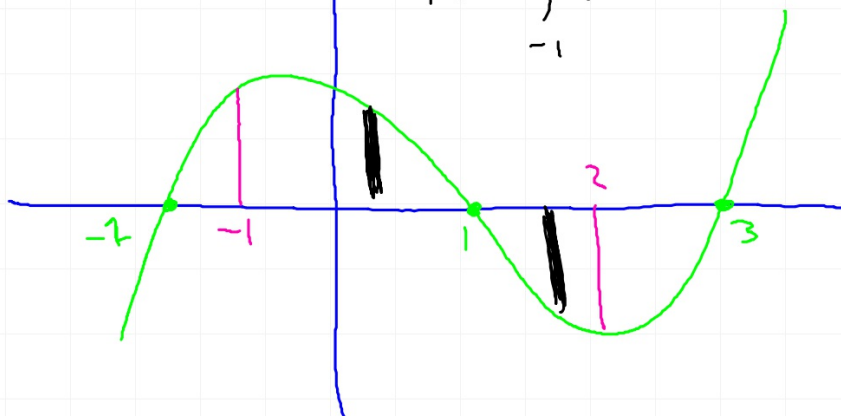
$$A = - \int_1^4 (x^2 - 4x) dx + \int_4^6 (x^2 - 4x) dx$$

Bounds: $y = x^3 - 2x^2 - 5x + 6$ x axis $x = -1$ and $x = 2$.

Zeros

$$x^3 - 2x^2 - 5x + 6 = 0 \rightarrow x = -2 \text{ or } x = 1 \text{ or } x = 3$$

$$A = \int_{-1}^1 (x^3 - 2x^2 - 5x + 6) dx - \int_1^2 (x^3 - 2x^2 - 5x + 6) dx$$

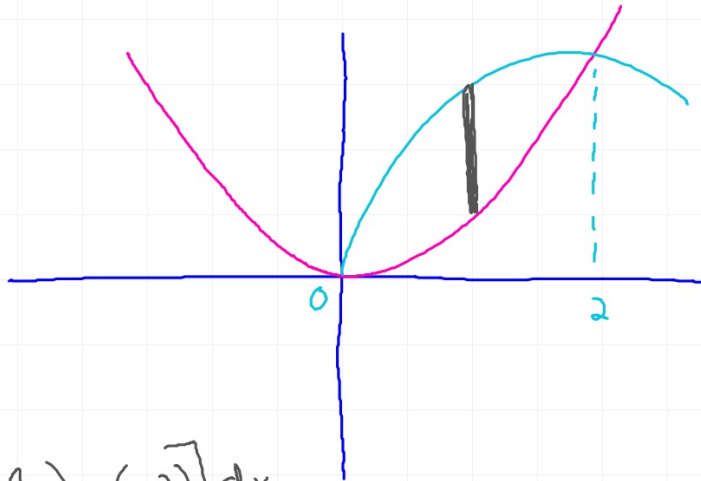


Bands: $y = x^2$ and $y = -x^2 + 4x$

1 sect

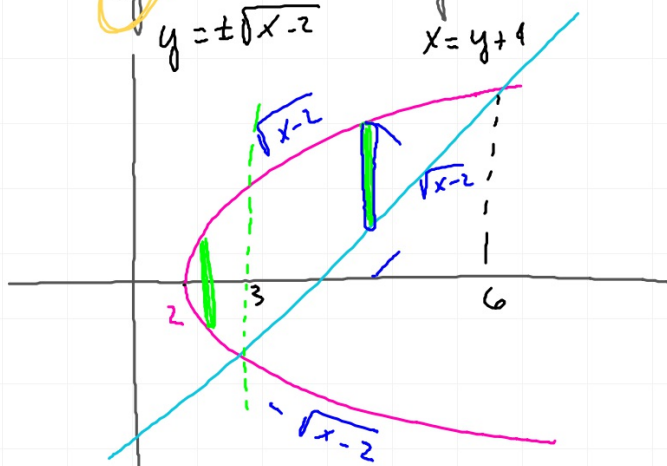
$$x^2 = -x^2 + 4x$$

$$x = 0 \text{ or } x = 2$$



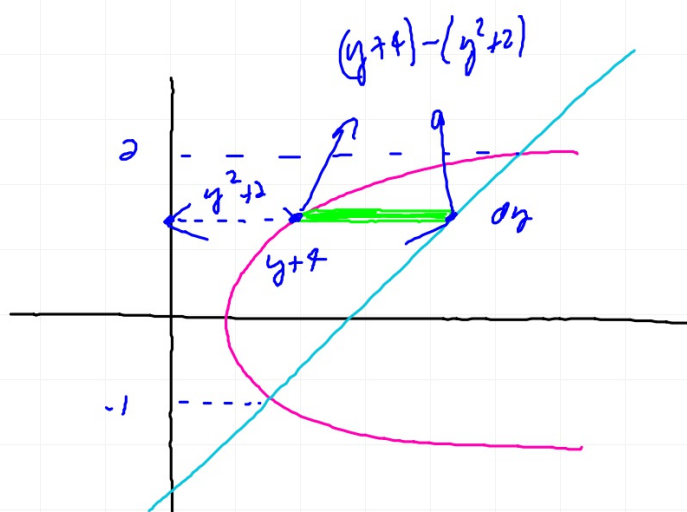
$$A = \int_0^2 [(-x^2 + 4x) - (x^2)] dx$$

Bands: $y^2 = x-2$ and $y = x-4$
 $y = \pm\sqrt{x-2}$ $x = y+4$



Sect
 $y^2 + 2 = y + 4$
 $y = -1 \wedge y = 2$
 $x = 3 \quad y = 6$

$$A = \int_2^3 (\sqrt{x-2} + \sqrt{x-2}) dx + \int_3^6 [\sqrt{x-2} - (x-4)] dx$$



sect
 $y = -1$ to $y = 2$

$$\begin{array}{ll} y^2 = x - 2 & y = x - 4 \\ x = y^2 + 2 & x = y + 4 \end{array}$$

$$A = \int_{-1}^2 [(y+4) - (y^2+2)] dy$$