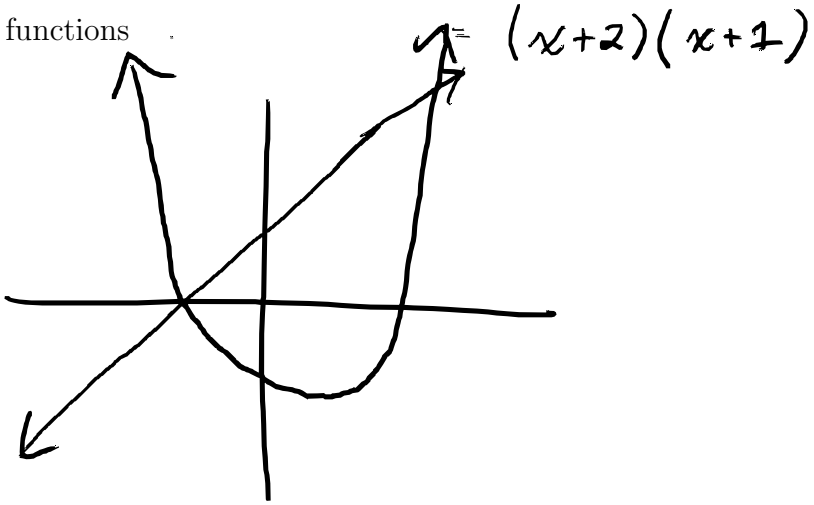
1. Consider the region bounded by $y = 4x + 8$ and $y = x^2 + 3x + 2$.

   a. Sketch the two functions



   b. Find the x bounds for the region

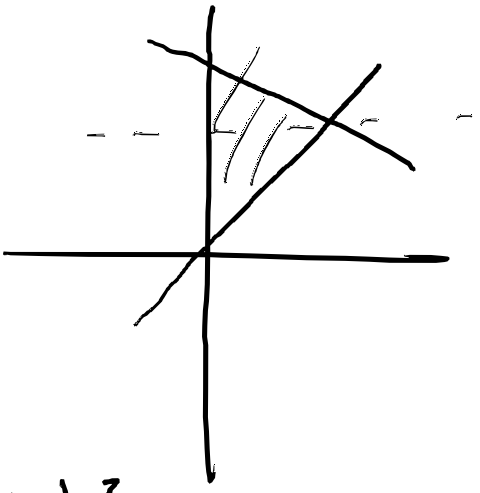
$$4x+8 = x^2+3x+2$$
$$0 = x^2 - x - 6$$
$$= (x-3)(x+2)$$

bounds $-2 \le x \le 3$

   c. Find the area of the region.

$$A = \int_{-2}^{3} (4x+8 - (x^2+3x+2))\,dx$$
$$= \int_{-2}^{3} (-x^2+x+6)\,dx$$
$$= \left(-\frac{x^3}{3} + \frac{x^2}{2} + 6x\right)\Big|_{-2}^{3} = -9 + \frac{9}{2} + 18 - \left(\frac{8}{3} + 2 - 12\right)$$

2. Find the area bounded by the functions $y = x$ and $y = -2x + 6$ by



a. Integrating with respect to x

$x = -2x + 6$

$3x = 6 \rightarrow x = 2$

intersect is $(2, 2)$

$$\int_0^2 (-2x + 6 - x)\,dx = \left(-\tfrac{3}{2}x^2 + 6x\right)\Big|_0^2$$

$$= -6 + 12$$

$$= 6$$

b. Integrating with respect to y

$x = y$ and $x = \frac{y-6}{-2}$

$$A = \int_0^2 y\,dy + \int_2^6 \frac{-y+6}{2}\,dy$$

$$= \tfrac{y^2}{2}\Big|_0^2 + \left(\frac{-y^2}{4} + 3y\right)\Big|_2^6$$

$$= 2 + \left(-9 + 18 - (-1 + 6)\right)$$

$$= 2 + 9 - 5 = 6$$