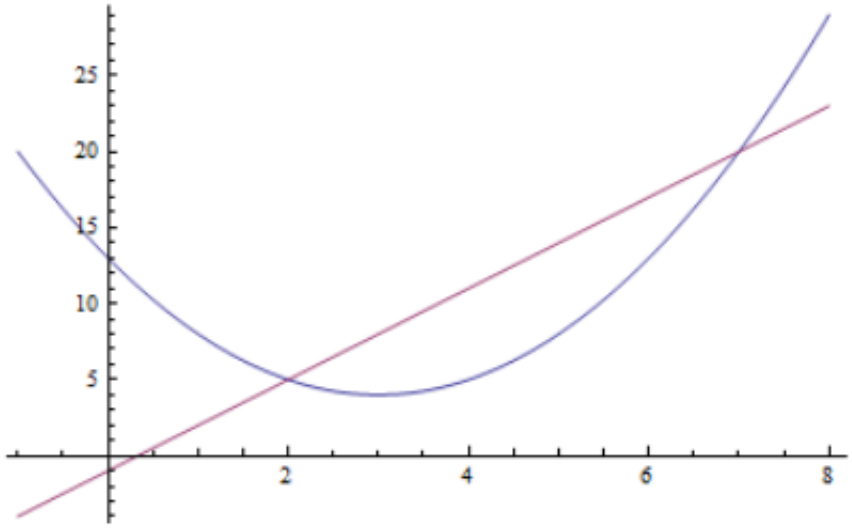
Recitation # 4: Volume by Shells & Length of Curves

Group work:

Problem 1 *Set up an integral that will compute the volume of the solid generated by revolving the region bounded by the curves* $y = x^2 - 6x + 13$ *(i.e.* $x = 3 \pm \sqrt{y-4}$*) and* $y = 3x - 1$ *about:*



Use both the washer method as well as the shell method for each problem. Which method would you prefer for each problem? Why?

(a) *the* x*-axis*

(b) $y = -4$

(c) $y = 22$

(d) *the* y*-axis*

(e) $x = -3$

(f) $x = 9$

Problem 2 **Set up** *an integral (or a sum of integrals) to find the perimeter of the region bounded by the curves* $y = 2x^2 - 5x + 13$ *and* $y = x^2 + 6x - 11$.

Problem 3 *Find the length of the following curves (length is in feet):*

(a) $y = \frac{1}{6}x^3 + \frac{1}{2x}$ *from* $\left(2, \frac{19}{12}\right)$ *to* $\left(3, \frac{14}{3}\right)$.

(b) $x = \frac{1}{9}e^{3y} + \frac{1}{4}e^{-3y}$ *from* $\left(\frac{13}{36}, 0\right)$ *to* $\left(\frac{265}{288}, \ln 2\right)$.