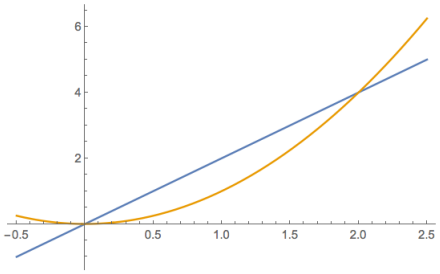
1. (a) Using $n = 4$ rectangles approximate the area between the curves $y = 2x$ and $y = x^2$ by averaging left and right sums then **also** by using midpoints.



(b) Let $f(t) = t^3$. Write a formula for a lefthand sums with 10 rectangles for the value of $\int_0^x f'(t)dt$.

(c) (DIFFICULT! Feel free to skip.) Suppose there are n rectangles instead of 10. Any guess what $\lim_{n\to\infty} \int_0^x f'(t)dt$ is equal to?

2. Differentiate the following functions:

(a) $f(x) = \sin^2(\cos^2(x))$.

(b) $g(x) = x^2 e^{x^2}$.

(c) $h(x) = e^{e^{e^x}}$.

3. Find the antiderivative, $F(x)$, for $f(x) = 2xe^{x^2} + 3x^2 \sin(x^3)$. *Hint: reverse chain rule.*