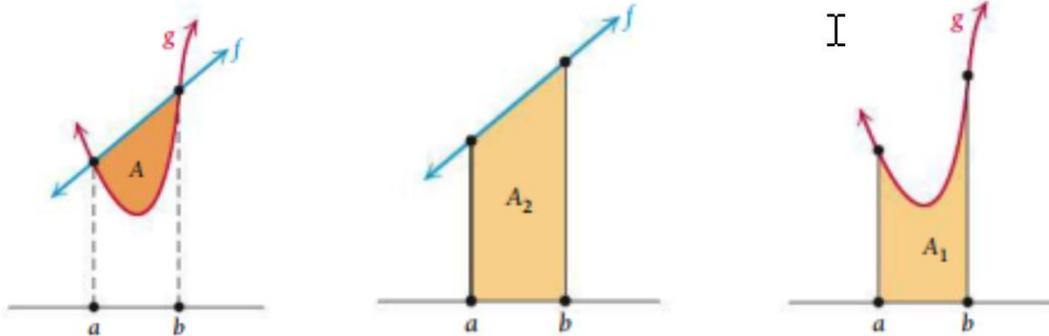


Recall: Finding the Area Bound by Multiple Graphs

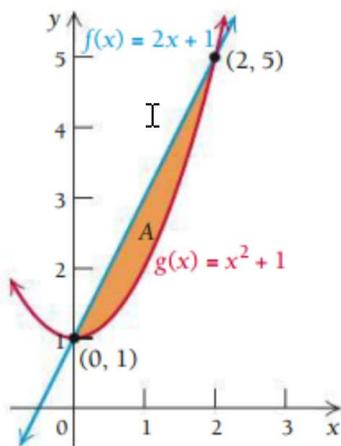
$$\int_a^b [f(x) - g(x)] dx = \int_a^b f(x) dx - \int_a^b g(x) dx$$



Step 1: determine which function has larger y -values

Step 2: determine integration bounds by finding the functions' intersection points (set functions equal to each other)

recall: find the area of the region **bound** by the graphs $f(x) = 2x + 1$, $g(x) = x^2 + 1$



ex. Use an integral to find area of a region bounded above by $y = e^x$, bounded below by $y = x$ and bounded on the sides by vertical lines $x = 0$ and $x = 1$.

ex. Find area of the region bounded by $y = x$, $y = x^3$, $x = 0$ and $x = 1$.

Do: sketch one period of $y = \sin x$, $y = \cos x$ on the same plane

ex. Find area of the region bounded by $y = \sin x$, $y = \cos x$, $x = 0$ and $x = \frac{\pi}{4}$.

ex. Find area of the region bounded by $y = \sin 2x$, $y = \cos x$, $x = 0$ and $x = \frac{\pi}{2}$.

Sometimes it makes more sense to integrate with respect to y :

ex. Find area enclosed by $x = 2y^2$ and $x = 4 + y^2$.

ex. Find area enclosed by $y = x - 1$ and $y^2 = 2x + 6$.