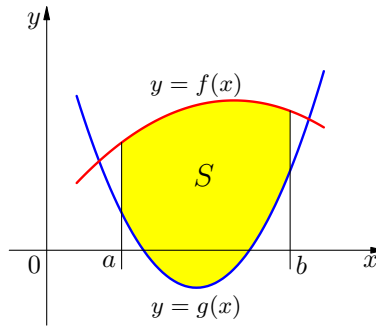


Chapter 7. Applications of integration
Section 7.1 Areas between curves

The area of the region bounded by the curves $y = f(x)$, $y = g(x)$, and the lines $x = a$ and $x = b$, where f and g are continuous functions and $f(x) \geq g(x)$ for all x in $[a, b]$, is

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



Example 1. Find the area of the region bounded by

1. $y = x^2$, $y^2 = x$

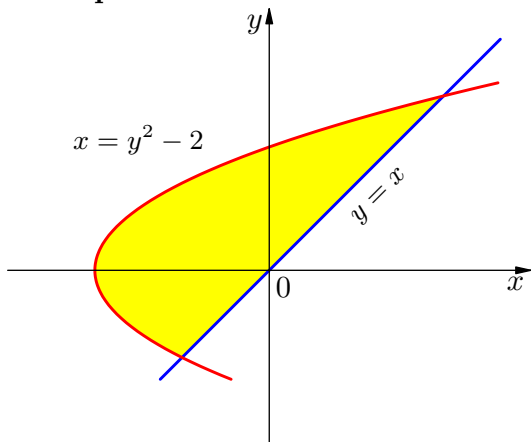
2. $y = \cos x$, $y = \sin 2x$, $x = 0$, $x = \pi/2$

3. $y = x^2 + 1$, $y = 3 - x^2$, $x = -1$, $x = 2$

In general case, the area between the curves $y = f(x)$, $y = g(x)$ and between $x = a$ and $x = b$, is

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

Example 2. Find the area of the shaded region.



If a region is bounded by curves with equations $x = f(y)$, $x = g(y)$, $y = c$ and $y = d$, where f and g are continuous functions and $f(y) \geq g(y)$ for all y in $[c, d]$, then its area is

$$A = \int_c^d [f(y) - g(y)] dy$$