Math 1432

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Office Hours (starting Monday):

Mondays 1-2pm,
Fridays noon-1pm
(also available by appointment)

Class webpage:

http://www.math.uh.edu/~bekki/Math1432.html

Reminders:

- Access Code (before this weekend)
- Poppers (start next week)
- Practice Test 1
- Test 1
- Quizzes

Section 7.3 - Area

So, we know that if $f(x)$ is on or above the x-axis over a region from $x = a$ to $x = b$ then

$$A = \int_a^b f(x)\,dx$$

Example:

Find the area of the region: $f(x) = x^2 + 4x - 12, \quad x \in [2,4]$

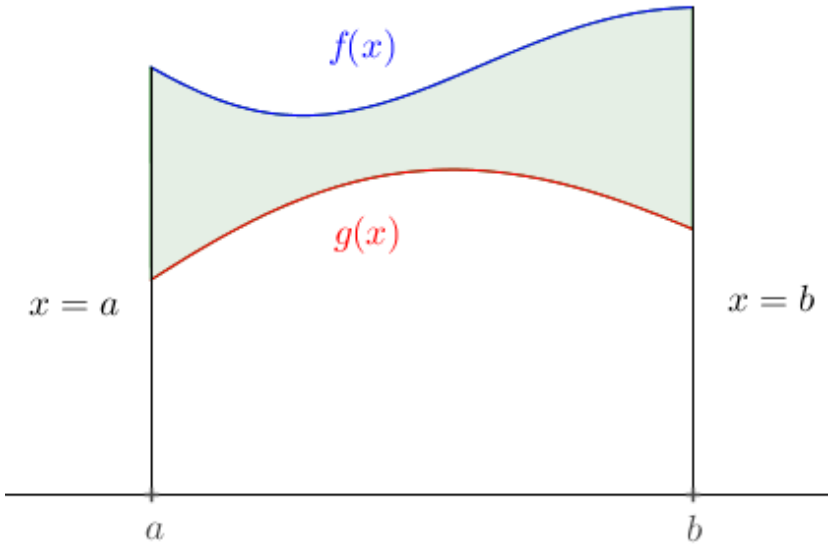
What about when $f(x)$ is below the x-axis?

Or part above and part below?

Example:
Find the area of the region bounded by the graph of $f(x) = \sin x, x \in [0, \pi]$

The area between two curves is found by integrating the difference of the larger function minus the smaller function over the region.

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



Sketch the region bounded by the graphs of the equations and determine the area of the enclosed region.

$f(x) = x^2$ and $g(x) = \sqrt{x}$

$$f(x) = -x^2 + 4x + 2, \quad g(x) = x + 2$$

Examples with absolute value.

$$\int_{-1}^{1} |x|\, dx =$$

$$\int_{-2}^{2} |3x+1|\, dx =$$

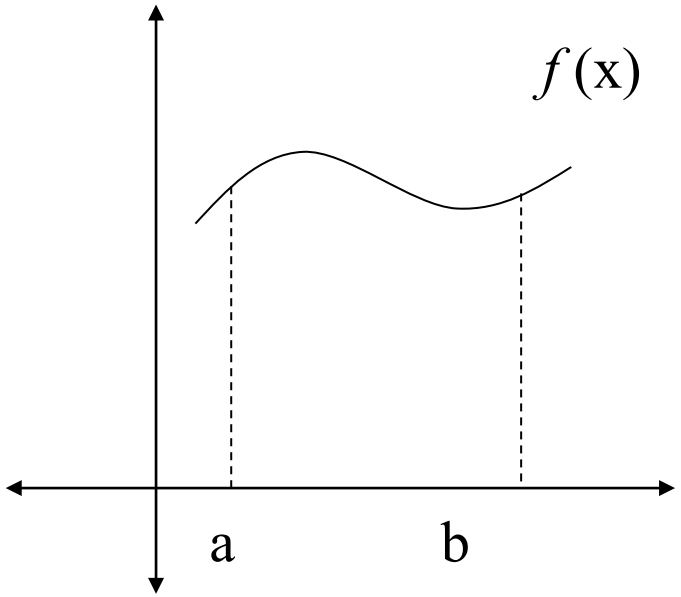
$$\int_0^3 \left| x^2 - 4 \right| dx =$$

$$\int_0^4 \left| x^2 - 4x + 3 \right| dx =$$

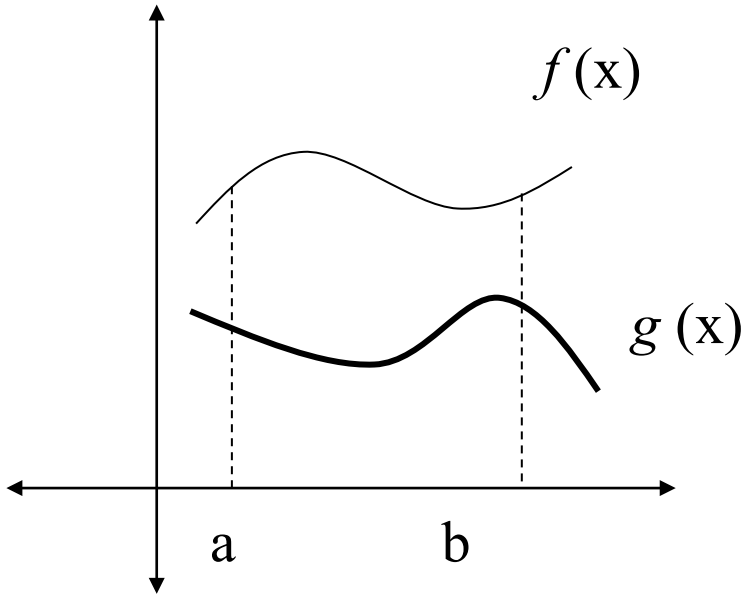
$$\int_1^4 \left(3 - \left| x - 3 \right| \right) dx =$$

Summary for the area between two curves:

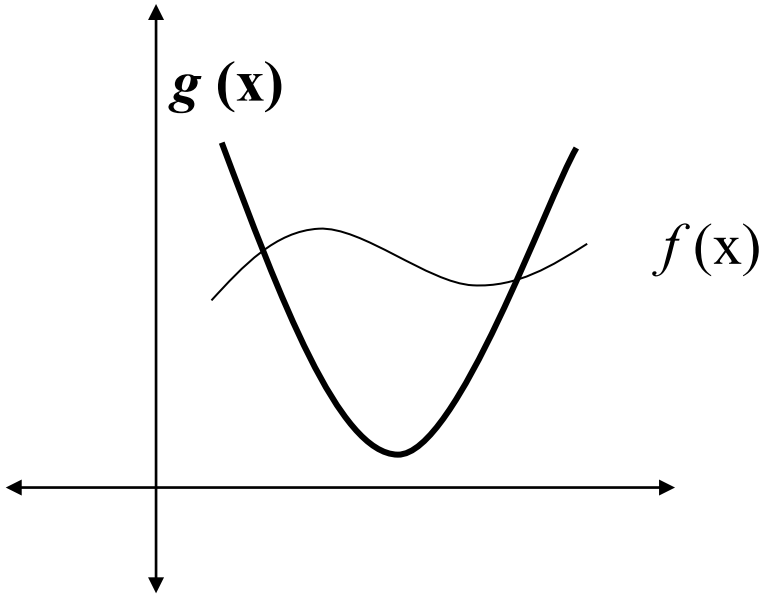
Basic.



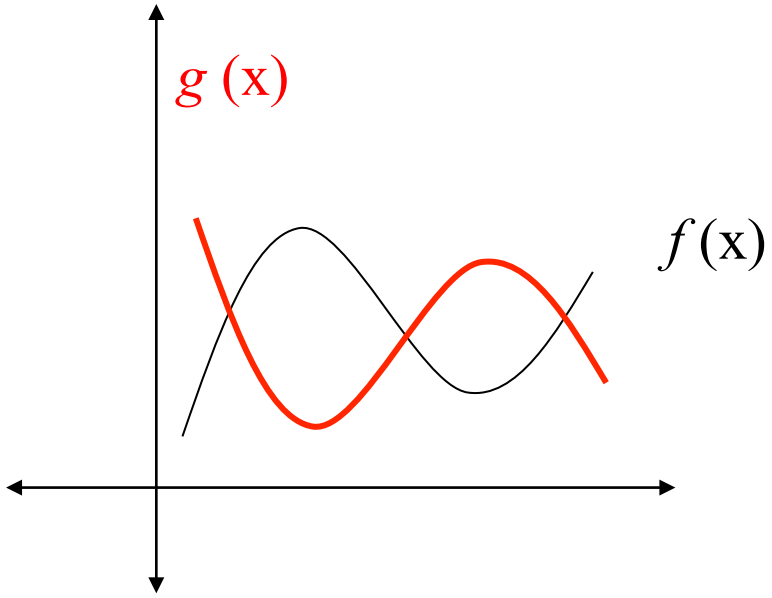
Two non-intersecting curves.



Two curves that intersect.



Two curves that intersect several times.



More Examples:

Find the area bounded by the graphs of $y = x^2 + 2$, $y = -x$, $x = 0$ and $x = 1$.

Find the area of the region bounded by $f(x) = 2 - x^2$ and $g(x) = x$.

Find the area bounded by $f(x) = \sin x$ and $g(x) = \cos x$ for $x \in [0, 2\pi]$