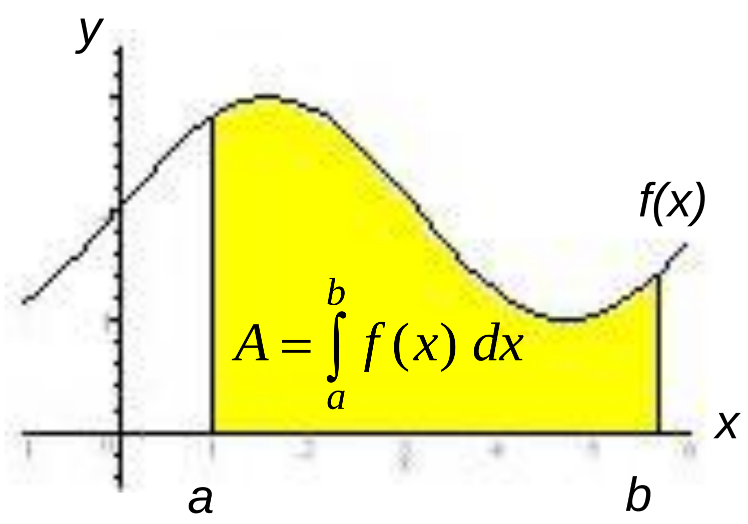
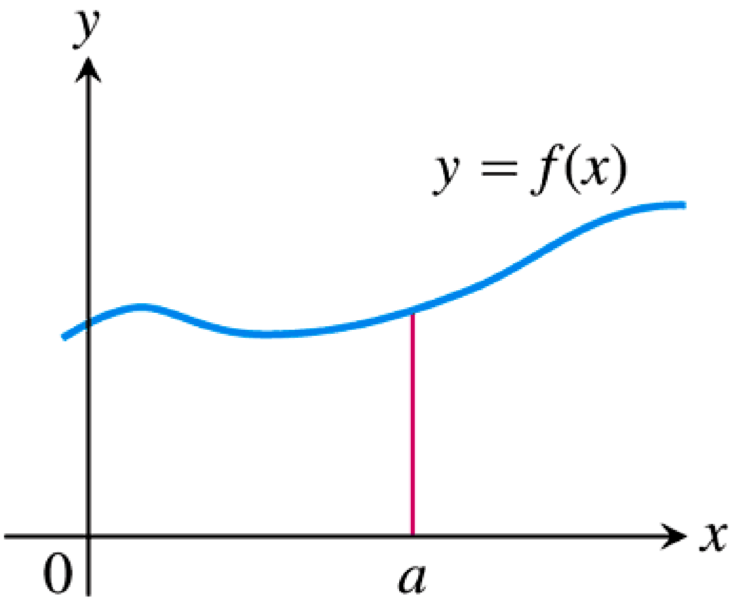
Properties of Integrals

1. $\int_a^b f(x)dx = -\int_b^a f(x)dx$



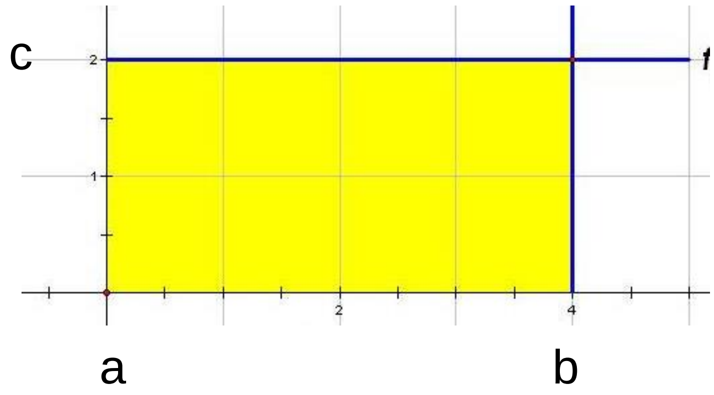
The width of the rectangle has change from $\frac{b-a}{n}$, a positive number to $\frac{a-b}{n}$, a negative number

2. $\int_a^a f(x) = 0$



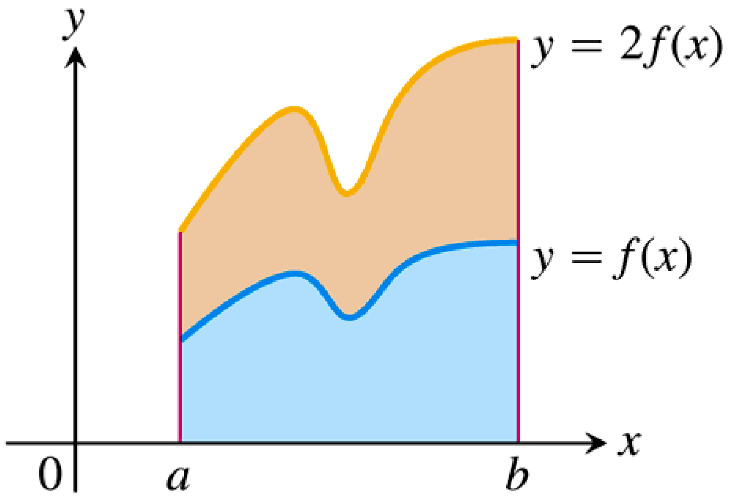
The area of a rectangle whose width is zero.

3. $\int_a^b c\,dx = c(b-a)$, WHERE C IS A CONSTANT



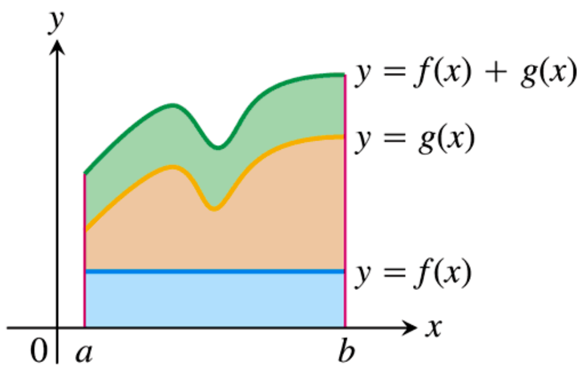
The integral is the area of a rectangle whose width is b – a and whose height is c

4. $\int_a^b cf(x)dx = c\int_a^b f(x)dx$



The width has not changed. If the height is 2 times the y-values of f(x), then the area is twice as large as the area under f(x).

5. $\int_a^b [f(x) \pm g(x)]dx = \int_a^b f(x)dx \pm \int_a^b g(x)dx$



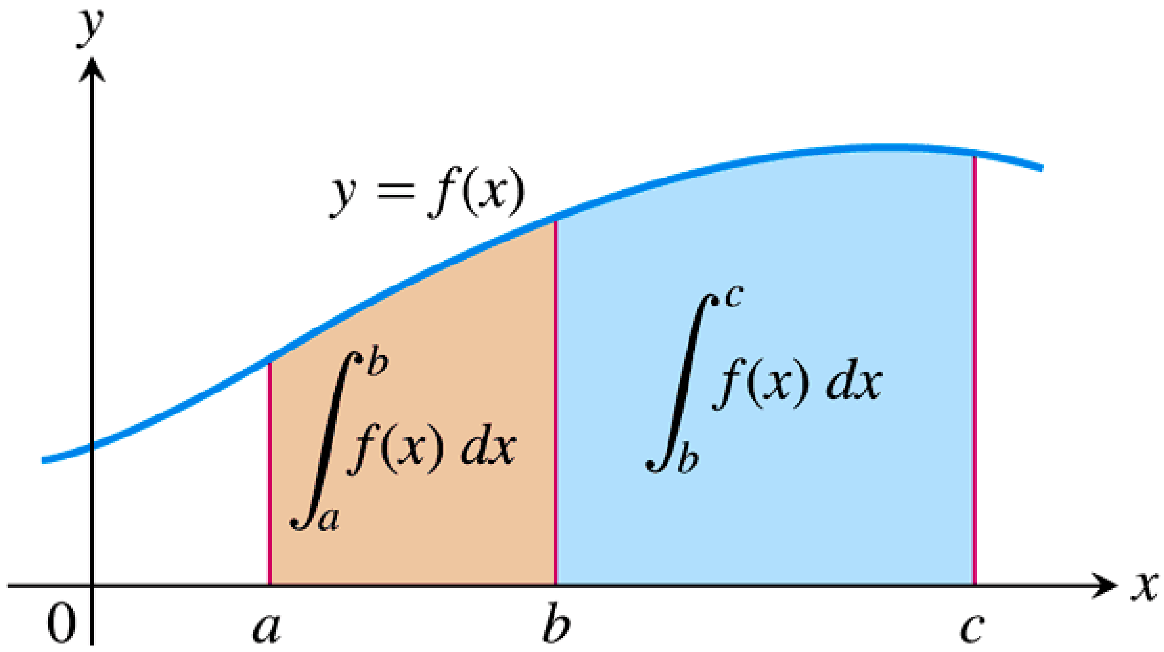
(c) *Sum: (areas add)*

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

Evaluate $\int_5^7 (4+3x^2)dx$ if $\int_5^7 x^2 dx = \frac{218}{3}$

6. If b is between a and c,

$$\int_a^b f(x)dx + \int_b^c f(x)dx = \int_a^c f(x)dx$$



$\int_0^{10} f(x)dx = 17 \quad and \quad \int_0^8 f(x)dx$ =12

Find $\int_8^{10} f(x)dx$