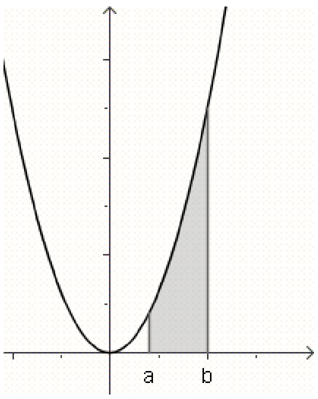
<u>Beispiel 1:</u> $f(x) = x^2$



analog dem Beispiel oben gilt: $\int_0^a x^2 dx = \frac{a^3}{3}$

Damit folgt: $\int_a^b x^2 dx = \int_0^b x^2 dx - \int_0^a x^2 dx = \frac{b^3}{3} - \frac{a^3}{3} =: \left[\frac{x^3}{3}\right]_a^b$

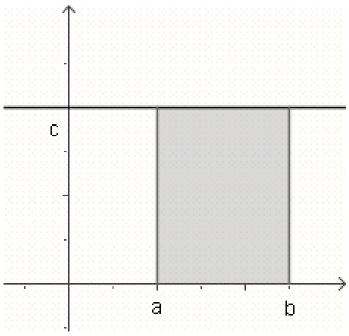
z.B.: $\int_1^2 x^2 dx = \frac{2^3}{3} - \frac{1^3}{3} = \frac{8}{3} - \frac{1}{3} = \frac{7}{3}$

$\int_2^1 x^2 dx = \frac{1^3}{3} - \frac{2^3}{3} = \frac{1}{3} - \frac{8}{3} = -\frac{7}{3}$

$\int_{-2}^0 x^2 dx = \frac{0^3}{3} - \frac{(-2)^3}{3} = \frac{0}{3} - \frac{-8}{3} = \frac{8}{3}$

<u>Schreibweise:</u> $\int_a^b x^2 dx = \frac{b^3}{3} - \frac{a^3}{3} =: \left[\frac{x^3}{3}\right]_a^b$

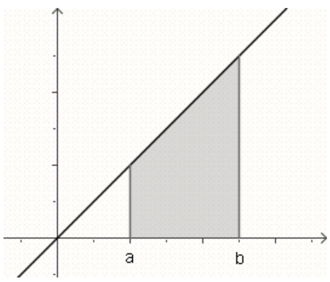
<u>Beispiel 2:</u> $f(x) = c$



Es gilt: $\int_a^b c dx = (c \cdot b - c \cdot a) = c \cdot (b - a) = c \cdot [x]_a^b$

z.B.: $\int_{-1}^3 4 dx = 4 \cdot (3 - (-1)) = 4 \cdot 4 = 16$

<u>Beispiel 3:</u> $f(x) = x$



Es gilt: $\int_a^b x dx = \frac{b^2}{2} - \frac{a^2}{2} = \frac{1}{2} \cdot [x^2]_a^b = \left[\frac{x^2}{2}\right]_a^b$

z.B.: $\int_1^2 x dx = \frac{2^2}{2} - \frac{1^2}{2} = \frac{3}{2}$

<u>allgemein gilt:</u>

$$\int_a^b x^n dx = \left[\frac{x^{n+1}}{n+1}\right]_a^b = \frac{b^{n+1}}{n+1} - \frac{a^{n+1}}{n+1}$$