

3.4 Integraler s. 178 - 180 uppgift: 3402-3408

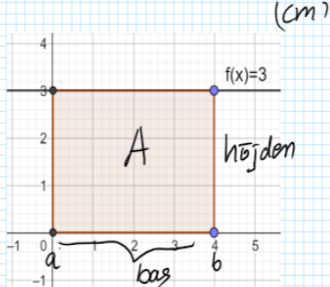
den 18 december 2018 12:11

Integraler används för att beskriva och beräkna längd, area, volym och m.m., där kan integraler beskrivas som en summa av en variabel.

Ex:  $f'(x) = \frac{df}{dx}$      $v'(t) = \frac{dv}{dt}$   
 $y'(x) = \frac{dy}{dx}$      $s'(t) = \frac{ds}{dt}$

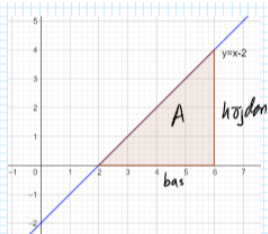
Area =  $\int_a^b f(x) dx = [F(x)]_a^b = F(b) - F(a)$

Beräkna den markerade arean



$A = (4-0) \cdot (3-0) = 4 \cdot 3 = 12 \text{ ae}$      $A = 12 \text{ cm}^2$

$A = \int_0^4 f(x) dx = \int_0^4 3 dx = [3x + C]_0^4 = (3 \cdot 4 + C) - (3 \cdot 0 + C) = 12 + C - 0 - C = 12 \text{ ae}$

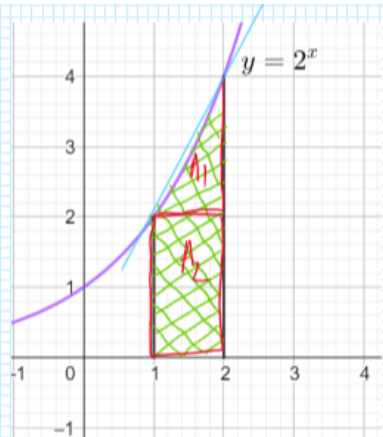


$A = \frac{4 \cdot 4}{2} = 8 \text{ ae}$

$A = \int_2^6 y dx = \int_2^6 x-2 dx = \left[ \frac{x^{1+1}}{1+1} - 2x \right]_2^6 = \left[ \frac{x^2}{2} - 2x \right]_2^6 = \left( \frac{6^2}{2} - 2(6) \right) - \left( \frac{2^2}{2} - 2(2) \right) = 18 - 12 - 2 + 4 = 8 \text{ ae}$



$A = \frac{\pi r^2}{2} = \frac{\pi 3^2}{2} = 4,5\pi \text{ ae}$



Funktion	Primitiva funktioner
$k$	$kx + C$
$x^n$ ( $n \neq -1$ )	$\frac{x^{n+1}}{n+1} + C$
$e^x$	$e^x + C$
$e^{kx}$	$\frac{e^{kx}}{k} + C$
$a^x$ ( $a > 0, a \neq 1$ )	$\frac{a^x}{\ln a} + C$

$A_1 \approx \frac{1 \cdot 2}{2} \approx 1 \text{ ae}$   
 $A_2 = 2 \cdot 1 = 2 \text{ ae}$      $\Rightarrow A \approx 3 \text{ ae}$

$A = \int_1^2 2^x dx = \left[ \frac{2^x}{\ln 2} \right]_1^2 = \frac{2^2}{\ln 2} - \frac{2^1}{\ln 2} = \frac{4-2}{\ln 2} = \frac{2}{\ln 2} \approx 2,885 \text{ ae}$