

Integration af $f(x) = x^n$

$$\int x^n dx = F(x)$$

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$$\int x^n dx = F(x) \Leftrightarrow F'(x) = x^n$$

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Undersøg om

$$F(x) = \frac{1}{1+n} \cdot x^{(n+1)} + C$$

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f	f'	
k	0	(1)
x^a	ax^{a-1}	(2)
$e^{k \cdot x}$	$k \cdot e^{k \cdot x}$	(3)
$\ln(x)$	$\frac{1}{x}$	(4)
a^x	$\ln(a) \cdot a^x$	(5)

f	f'	
$g + h$	$g' + h'$	(6)
$k \cdot g(x)$	$k \cdot g'(x)$	(7)
$g \cdot h$	$g' \cdot h + g \cdot h'$	(8)
$g(h(x))$	$g'(h(x)) \cdot h'(x)$	(9)

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$$\left(\frac{1}{1+n} x^{(n+1)} + C \right)'$$

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$$\left(\frac{1}{1+n} x^{(n+1)} + C \right)' = \frac{1}{1+n} \cdot (n+1) x^{(n+1)-1} + 0$$

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$$\begin{aligned} \left(\frac{1}{1+n} x^{(n+1)} + C \right)' &= \frac{1}{1+n} \cdot (n+1) x^{(n+1)-1} + 0 \\ &= 1 x^{(n+1)-1} + 0 \end{aligned}$$

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Integration af $f(x) = x^n$

Regneregler for integration

f	F
x^n	$\frac{1}{n+1}x^{(n+1)} + C \quad (1)$
\sqrt{x}	$\frac{2}{3}x^{3/2} + C \quad (2)$

Integration af $f(x) = x^n$

Eksempel 1

$$\int x^4 dx$$

Regneregler for integration

f	F
x^n	$\frac{1}{n+1}x^{(n+1)} + C \quad (1)$
\sqrt{x}	$\frac{2}{3}x^{3/2} + C \quad (2)$

Integration af $f(x) = x^n$

Eksempel 1

$$\int x^4 dx = \frac{1}{4+1} x^{4+1} + C$$

Regneregler for integration

f	F
x^n	$\frac{1}{n+1} x^{(n+1)} + C \quad (1)$
\sqrt{x}	$\frac{2}{3} x^{3/2} + C \quad (2)$

Integration af $f(x) = x^n$

Eksempel 1

$$\begin{aligned}\int x^4 dx &= \frac{1}{4+1} x^{4+1} + C \\ &= \frac{1}{5} x^5 + C\end{aligned}$$

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x^n	$\frac{1}{n+1} x^{(n+1)} + C \quad (1)$
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$$\begin{aligned}\int x^4 dx &= \frac{1}{4+1} x^{4+1} + C \\ &= \frac{1}{5} x^5 + C\end{aligned}$$

Eksempel 2

$$\int x^{\frac{1}{2}} dx$$

Regneregler for integration

f	F
x^n	$\frac{1}{n+1} x^{(n+1)} + C \quad (1)$
\sqrt{x}	$\frac{2}{3} x^{3/2} + C \quad (2)$

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$$\begin{aligned}\int x^4 dx &= \frac{1}{4+1} x^{4+1} + C \\ &= \frac{1}{5} x^5 + C\end{aligned}$$

Eksempel 2

$$\int x^{\frac{1}{2}} dx = \frac{1}{\frac{1}{2}+1} x^{\frac{1}{2}+1} + C$$

Regneregler for integration

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x^n	$\frac{1}{n+1} x^{(n+1)} + C \quad (1)$
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