# Derivatan av $x^p$

$$\frac{d}{dx}(x^p) = \lim_{h\to 0} \frac{(x+h)^p - x^p}{h} =$$

$$= \lim_{h\to 0} \frac{x^p + p x^{p-1}\cdot h + p x^{p-2}\cdot h^2 + \dots - x^p}{h} = p x^{p-1}$$

| $p$ | $\frac{d}{dx}(x^p)$ |
|---|---|
| 0 | 0 |
| 1 | 1 |
| 2 | $2x$ |
| 3 | $3x^2$ |
| 4 | $4x^3$ |
| 5 | $5x^4$ |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | 1 | | | | |
| 1 | | | | 1 | | 1 | | | |
| 2 | | | 1 | | 2 | | 1 | | |
| 3 | | | | 1 | | 3 | | 3 | | 1 | | | |
| 4 | | | | | 1 | | 4 | | 6 | | 4 | | 1 | | |
| 5 | | | | 1 | | 5 | | 10 | | 10 | | 5 | | 1 | |