

# Ableitungsregeln

Mittwoch, 3. April 2024

16:59

Faktorregel:

$$f(x) = a x^u$$

$$f'(x) = a \cdot u \cdot x^{u-1}$$

Bsp.  $f(x) = 2x^3$

$$f'(x) = 3 \cdot 2x^{3-1} = 6x^2$$

Summenregel:

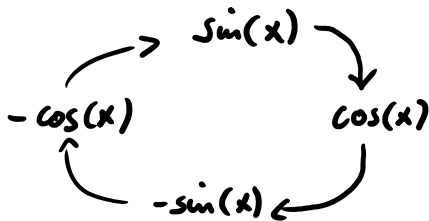
$$f(x) = u(x) + v(x)$$

Bsp.  $f(x) = 2x^3 + 4x$

$$f'(x) = u'(x) + v'(x)$$

$$f'(x) = 6x^2 + 4x^0$$

Trigonometrische Funktionen ableiten:



Produktregel:

$$f(x) = u(x) \cdot v(x)$$

Bsp.  $f(x) = 2x^2 \cdot \sin(x)$

$$f'(x) = u'(x) \cdot v(x) + u(x) \cdot v'(x)$$

$$f'(x) = 4x \cdot \sin(x) + 2x^2 \cdot \cos(x)$$

Quotientenregel:

$$f(x) = \frac{u(x)}{v(x)}$$

Bsp.  $f(x) = \frac{2x}{\sin(x)}$

$$f'(x) = \frac{u'(x) \cdot v(x) - u(x) \cdot v'(x)}{v^2(x)}$$

$$f'(x) = \frac{2 \cdot \sin(x) - 2x \cdot \cos(x)}{(\sin(x))^2}$$

Kettenregel:

$$f(x) = k(u(x))$$

Bsp.  $f(x) = \sin(2x)$

$$f'(x) = u'(x) \cdot k'(u(x))$$

$$f'(x) = 2 \cdot \cos(2x)$$

$$f'(x) = u'(x) \cdot K'(u(x))$$

$$f'(x) = 2 \cdot \cos(2x)$$

$$\text{z.Bsp. } f(x) = e^{2x} = \exp(2x)$$

$$f'(x) = 2 \cdot e^{2x}$$

$$(e^x)' = e^x$$