Stevan Vlajic

17te Mathe Hausübung am 27.11.22.

4.68) a)

$f(x) = x^2 - 5x + 11 \quad k = \frac{1}{2}$

$f'(x) = 2x - 5 \qquad \frac{1}{2} = 2x - 5 \mid +5 \mid :2 \qquad x = \frac{11}{4}$

4.69c) $\tan(30°) = k = f'(x) \qquad \tan(30°) = f'(x)$

$g = 5 - \sqrt{x} \qquad \tan(30°) = -\frac{1}{2\sqrt{x}} \mid \cdot 2$

$f'(x) = 5 - x^{\frac{1}{2}} \qquad f'(x) = 0 - \frac{1}{2} x^{-\frac{1}{2}}$

negative Wurzel d.h. → keine Tangente mit $\alpha = 30°$

$f'(x) = -\frac{1}{2} \cdot \frac{1}{\sqrt{x}} = \frac{-1}{2\sqrt{x}}$

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4. Test

$f(x) = x^4 + 10x^3 + 36x^2 \qquad f'(x) = 4x^3 + 30x^2 + 72x$

$f''(x) = 12x^2 + 60x + 72$

gelöst mit großen Lösungsformel

$12x^2 + 60x + 72 = 0$

$x_1 = -2, \quad x_2 = -3$

4.84a)-c) $u = 5\ln(x) \quad u' = \frac{5}{x} \qquad v = 5 \quad v' = 0$

a) $f(x) = 5 \cdot \ln(x) + 5$

$f'(x) = \frac{5}{x}$

b) $f(x) = 1 + x + \lg(x)$

$f'(x) = 1 + \frac{1}{x \cdot \ln(10)}$

c) $g(t) = 2 \cdot \ln(t) - t \cdot \ln(2)$

$g'(t) = \frac{2}{t} - \ln(2)$

4.88a)b)

a) $y = \sin(\alpha) \cdot \sin(t) + \cos(\alpha) \cdot \cos(t)$

$\frac{dy}{d\alpha} = \cos(\alpha) \cdot \sin(t) - \sin(\alpha) \cdot \cos(t)$

$\frac{dy}{dt} = \sin(\alpha) \cdot \cos(t) - \cos(\alpha) \cdot \sin(t)$

4.99b)c) $x_0 = 1 \qquad y = 2$

b) $f(x) = 2 + 0{,}5 \cdot \ln(x) \qquad f'(x) = \frac{0{,}5}{x}$

$2 = 1 \cdot 0{,}5 + d \qquad k = 0{,}5$

$d = 1{,}5 \qquad t(x) = 0{,}5 \cdot x + 1{,}5$ ← b)

4.110a-d) a) $f(x) = x^3 \cdot \ln(x) \qquad f'(x) = 2x^2 \cdot \ln(x) + \frac{1}{x} \cdot x^3 \cdot x^2$

$u = x^3 \quad u' = 2x^2$

$v = \ln(x) \quad v' = \frac{1}{x}$

$f'(x) = 2x^2 \cdot \ln(x) + x^2$

17z Mathe HÜ coeiten Stevan Vlajic 27.11.22

4.110 b) $f(x) = x \cdot \lg(x)$ $u = x$ $u' = 0$; $v = \lg(x)$ $v' = \frac{1}{\ln(10)}$

$f'(x) = \lg(x) + \frac{1}{\ln(10)}$

c) $f(x) = \ln(x) \cdot \sin(x)$ $u = \ln(x)$ $u' = \frac{1}{x}$; $v = \sin(x)$ $v' = \cos(x)$

$f'(x) = \frac{1}{x} \cdot \sin(x) + \cos(x) \cdot \ln(x)$

d) $f(t) = 3e^t \cdot \ln(t)$ $u = 3e^t$ $u' = 3e^t$; $v = \ln(t)$ $v' = \frac{1}{x}$

$f'(t) = 3e^t \cdot \ln(t) + \frac{1}{t} \cdot 3e^t$

4.97 c)

$y(t) = t - 2 \cdot \sin(t)$, $t_0 = \frac{5\pi}{3}$ $y'(\frac{5\pi}{3}) = \frac{5\pi}{3} - 2 \cdot \sin(\frac{5\pi}{3}) = -0{,}68$

4.88 b) $t = \frac{s^x}{3} - y^5$ $\frac{dt}{ds} = \frac{x \cdot s^{x-1}}{3}$

$\frac{dt}{dy} = \frac{s^x \cdot \ln(s)}{3} - 5y^4$