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Nr. 9) $f(x) = 2\sin(x) - 1$; $P(\pi \mid f(\pi))$ $P(u \mid f(u))$

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

$t(x) = f'(u) \cdot (x - u) + f(u)$

$t(x) = f'(\pi) \cdot (x - \pi) + f(\pi)$

$t(x) = 2 \cdot \cos(\pi) \cdot (x - \pi) + 2 \cdot \sin(\pi) - 1$

$t(x) = 2 \cdot (-1) \cdot (x - \pi) + 2 \cdot 0 - 1$

$\underline{\underline{t(x) = -2x + 2\pi - 1}}$

Nr. 10) a) $g(x) = \cos(x)$; $x \in [0; 2\pi)$

$g'(x) = -\sin(x)$

$g''(x) = (-1) \cdot \cos(x)$

Notw. Bed. für Wendepunkt $g''(x) = 0$

$\Rightarrow x_{w_1} = \frac{\pi}{2} \lor x_{w_2} = \frac{3}{2}\pi$

hinr. Bed. $g'''(x) \neq 0$

$g'''(x) = \sin(x) \Rightarrow \sin(\frac{\pi}{2}) = 1 \neq 0$

$\sin(\frac{3}{2}\pi) = -1 \neq 0$

$\Rightarrow \underline{\underline{W_1(\frac{\pi}{2} \mid 0)}} \lor \underline{\underline{W_2(\frac{3}{2}\pi \mid 0)}}$

b) Tangente $t_1(x) = g'(\frac{\pi}{2}) \cdot (x - \frac{\pi}{2}) + g(\frac{\pi}{2})$

$\underline{t_1(x)} = -1(x - \frac{\pi}{2}) + 0 = \underline{-x + \frac{\pi}{2}}$

$t_2(x) = g'(\frac{3}{2}\pi)(x - \frac{\pi}{2}) + g(\frac{3}{2}\pi)$

$\underline{\underline{t_2(x)}} = 1 \cdot (x - \frac{3 \cdot \pi}{2}) + 0 = \underline{\underline{x - \frac{3\pi}{2}}}$

Schnitt der Tangenten

$t_1(x) = t_2(x) \Rightarrow -x + \frac{\pi}{2} = x - \frac{3\pi}{2} \Rightarrow 2x = 2\pi \Rightarrow x_s = \pi$

$\underline{\underline{S(\pi \mid t(\pi)) = (\pi \mid -\frac{\pi}{2})}}$

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Nr. 11) a) $f(x) = \sin(x) \rightarrow f'(x) = \cos(x) \rightarrow f''(x) = -\sin(x)$

$\rightarrow f'''(x) = -\cos(x) \rightarrow f^{(4)}(x) = \sin(x)$

b) $f^{(12)}(x) = \sin(x)$

$f^{(27)}(x) = -\cos(x)$

c) $g(x) = \cos(x)$

$g^{13}(x) = f^{(14)}(x) = -\sin(x)$

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