Nr. 14.) a) $f(x) = \frac{\sin(x)}{x} = \sin(x) \cdot x^{-1}$; $x \neq 0$

$f'(x) = \cos(x) \cdot x^{-1} - \sin(x) \cdot x^{-2} = \frac{\cos(x)}{x} - \frac{\sin(x)}{x^2}$

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

b) $f(x) = \frac{x+1}{x-1} = (x+1) \cdot (x-1)^{-1}$; $x \neq 1$

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

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

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

c) $\frac{u}{v} = u \cdot v^{-1}$; $v \neq 0$

$\left(\frac{u}{v}\right)' = u' \cdot v^{-1} + u \cdot (-1) \cdot v^{-2} \cdot v' = \frac{u'}{v} - \frac{u \cdot v'}{v^2}$

$\left(\frac{u}{v}\right)' = \frac{u' \cdot v - u \cdot v'}{v^2}$ Quotientenregel

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

$f'(x) = \frac{\cos(x) \cdot x - \sin(x) \cdot 1}{x^2}$

$f(x) = \frac{x+1}{x-1}$

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

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Nr. 14) e) $F(x) = \dfrac{1-x^2}{3x+1}$

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

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

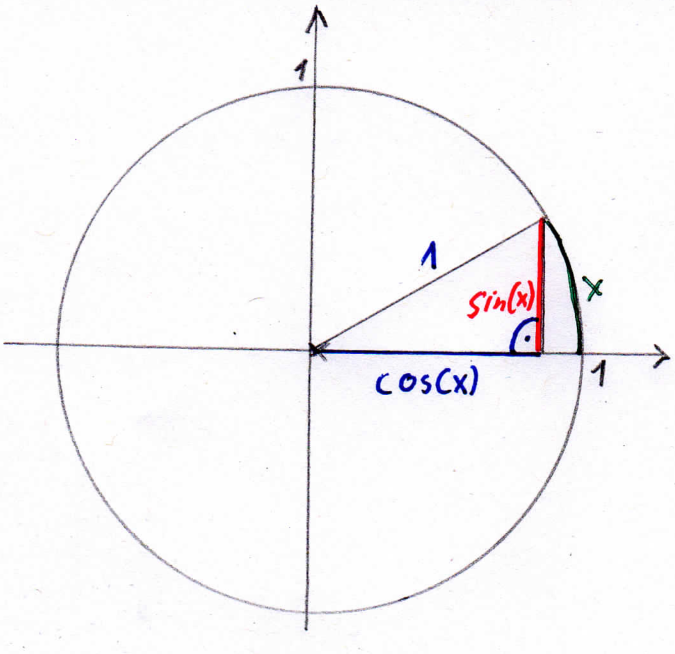
$$g(x) = \frac{\cos(x)}{x}$$

$$g'(x) = \frac{-\sin(x)\cdot x-\cos(x)\cdot 1}{x^2} = \frac{-x\cdot\sin(x)-\cos(x)}{x^2}$$

$$h(x) = \frac{\sin(x)}{\cos(x)}$$

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

$$h'(x) = \frac{(\cos(x))^2+(\sin(x))^2}{(\cos(x))^2} = \frac{1}{(\cos(x))^2} = \frac{1}{\cos^2(x)}$$



Nach Pythagoras

$\sin^2(x)+\cos^2(x)=1^2$

O. Fell