6. (Příjmení P-Si)

a) $f(x) = \text{arctg}\left(\frac{x}{x-1}\right)$; p: $\underbrace{y = 1-x}_{k=-1}$

$D_f: \mathbb{R} \setminus \{1\}$

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

$$\frac{-1}{2x^2-2x+1} = -1$$

$$2x^2-2x+1 = 1$$

$$2x(x-1) = 0$$

$x_1 = 0 \rightarrow f'(0) = \frac{-1}{1} = -1$

$x_2 = 1 \notin D_f$

$f(x_0) = f(0) = \text{arctg}\, 0 = 0$

$$y - f(x_0) = f'(x_0) \cdot (x - x_0)$$

$$y - 0 = -1 \cdot x$$

$$y = -x$$

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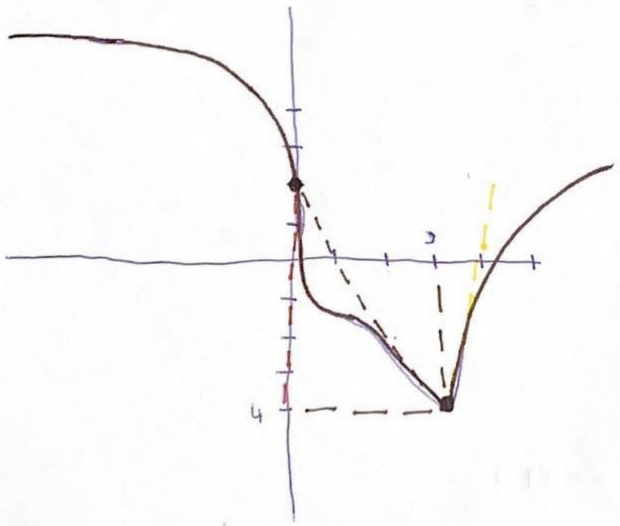
b)



$f(0) = 2$

$f'(0) = -\infty$

$f(3) = -4$

$f'_-(3) = -2$

$f'_+(3) = 4$