$$\Leftrightarrow \begin{cases} c = 0 & (1) \\ 900a + 30b + c = 0 & (2) \\ 225a + 15b + c = 10 & (3) \end{cases}$$

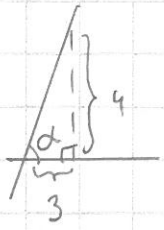
$(2) - 2\cdot(3)$: $450a - \underbrace{c}_{=0} = -20$ $\quad 1:450 \Leftrightarrow a = -\frac{2}{45}$

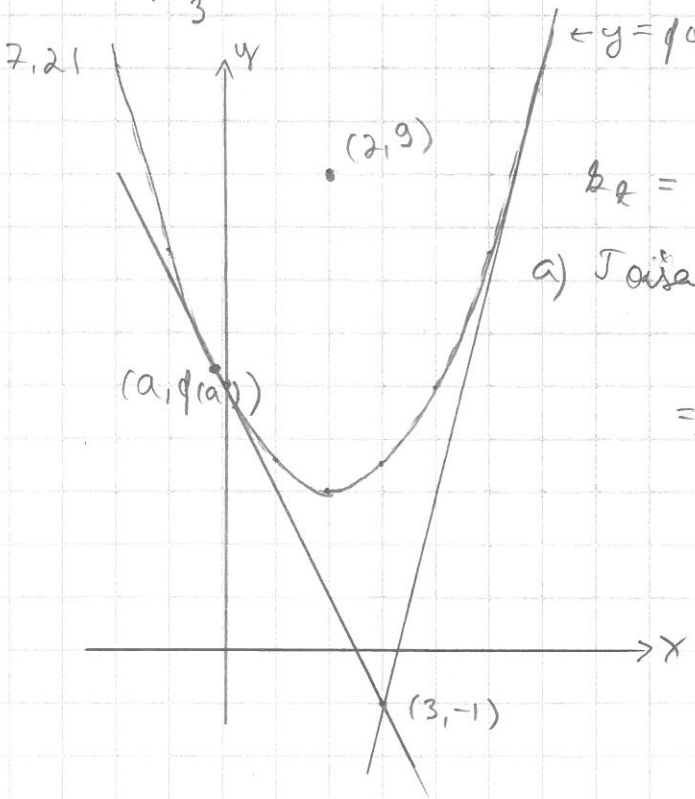
(2) : $900\cdot\left(-\frac{2}{45}\right) + 30b + 0 = 0 \Leftrightarrow b = \frac{4}{3}$

$\Rightarrow y = -\frac{2}{45}x^2 + \frac{4}{3}x$

$\Rightarrow y' = -\frac{4}{45}x + \frac{4}{3}$ $\quad \Rightarrow k_t = y'(0) = \frac{4}{3} = \tan\alpha$

$\Rightarrow \alpha \approx 53{,}1^\circ$





$\leftarrow y = f(x) = \frac{1}{2}x^2 - 2x + 5$

$f'(x) = x - 2$

$k_t = f'(a) = a - 2$

a) Toisaalta : $k_t = \frac{\Delta y}{\Delta x} = \frac{f(a) - (-1)}{a - 3}$

$\Rightarrow \frac{f(a)+1}{a-3} = a - 2 \quad | \cdot (a-3) \neq 0$

$\Leftrightarrow \left(\frac{1}{2}a^2 - 2a + 5\right) + 1 = (a-2)(a-3)$

$\Leftrightarrow \frac{1}{2}a^2 - 2a + 6 = a^2 - 5a + 6 \quad | \cdot 2$

$\Leftrightarrow a^2 - 4a + 12 = 2a^2 - 10a + 12$

$\Leftrightarrow a^2 - 6a = 0$

$\Leftrightarrow a(a-6) = 0 \Leftrightarrow a = \begin{cases} 0 \\ 6 \end{cases}$

1° $a = 0 \Rightarrow k_t = a - 2 = -2 \Rightarrow$ tangentti : $y - (-1) = -2(x - 3)$

$\Leftrightarrow \underline{y = -2x + 5}$

2° $a = 6 \Rightarrow k_t = a - 2 = 6 - 2 = 4 \Rightarrow$ tangentti : $y - (-1) = 4(x - 3)$

$\Leftrightarrow \underline{y = 4x - 13}$

b) Kuten a-kohta

TAI: Piirretään tangentti käyrän pisteeseen $(a, f(a))$

$\Rightarrow$ tangentti : $y - f(a) = f'(a)(x - a)$

$\Leftrightarrow y - \left(\frac{1}{2}a^2 - 2a + 5\right) = (a-2)(x-a)$

Piste $(2,9)$ on tangentilla : $9 - \left(\frac{1}{2}a^2 - 2a + 5\right) = (a-2)(2-a)$

$\Leftrightarrow a^2 - 4a + 16 = 0$, $D = (-4)^2 - 4\cdot 1\cdot 16 = -48 < 0$ $\Rightarrow$ ei ratk.