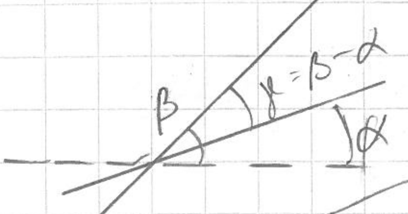
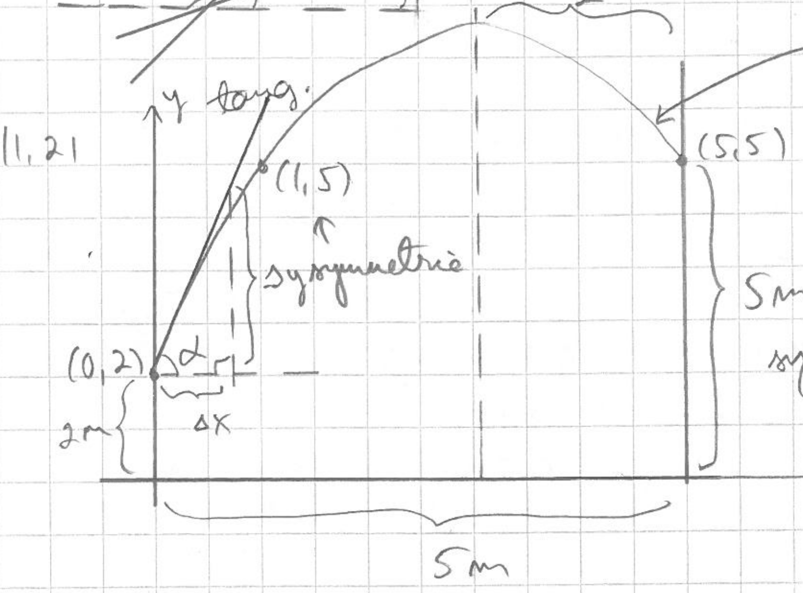


leikkauskulma: $\gamma = \beta - \alpha \approx \underline{58^\circ}$

11,21



$y = ax^2 + bx + c$

$(0,2): a\cdot 0^2 + b\cdot 0 + c = 2$

$(5,5): a\cdot 5^2 + b\cdot 5 + c = 5$

$(1,5): a\cdot 1^2 + b\cdot 1 + c = 5$

symmetria

$$\Leftrightarrow \begin{cases} c = 2 & (1) \\ 25a + 5b + c = 5 & (2) \\ a + b + c = 5 & (3) \end{cases}$$

$(2) - 5\cdot(3): 20a - 4c = -20$

$\Leftrightarrow 20a - 4\cdot 2 = -20$

$\Leftrightarrow 20a = -12 \quad | :20$

$\Leftrightarrow a = \frac{-12}{20} = -\frac{3}{5}$

$(3): b = 5 - a - c = 5 + \frac{3}{5} - 2 = \frac{18}{5}$

⌈ $y' = 2ax + b \Rightarrow y'(3) = 2a\cdot 3 + b = 0$

(1,5) on paraabelilla, symmetria ⌋

$\Rightarrow y = -\frac{3}{5}x^2 + \frac{18}{5}x + 2$

$\Rightarrow y' = -\frac{6}{5}x + \frac{18}{5} \quad \Rightarrow k_t = y'(0) = \frac{18}{5} = \frac{\Delta y}{\Delta x} = \tan\alpha$

$\Rightarrow \underline{\alpha \approx 74^\circ}$

11.17 alussa: 3,6 (mg) $\cdot x$

1 h:n kuluttua: $x\cdot 3{,}6$ $\cdot x$

2 — " — : $x^2\cdot 3{,}6$ $\cdot x$

3 — " — : $x^3\cdot 3{,}6$

⋮

1,8 — " — : $x^{1{,}8}\cdot 3{,}6 = \frac{1}{2}\cdot 3{,}6 \quad | :3{,}6$

$\Leftrightarrow x^{1{,}8} = \frac{1}{2} \quad | (\;)^{\frac{1}{1{,}8}}$

$\Leftrightarrow \underbrace{(x^{1{,}8})^{\frac{1}{1{,}8}}} = \left(\frac{1}{2}\right)^{\frac{1}{1{,}8}} \approx 0{,}680395$

$x^{1{,}8\cdot\frac{1}{1{,}8}} = x^1 = x$

potenssifunktio

$\boxed{\begin{array}{l} D\,x^3 = 3x^2 \\ D\,3^x = 3^x \ln 3 \end{array}}$

eksponenttifunktio

a) t:n tunnin kuluttua: $\underline{f(t) = 0{,}6804^t \cdot 3{,}6 \text{ mg}}$

b) $f'(t) = 3{,}6 \cdot 0{,}6804^t \cdot \ln 0{,}6804$ (mg/h)

$f'(0{,}5) \approx -1{,}1$ (mg/h) $\Rightarrow$ vähenee nopeudella $\underline{1{,}1 \frac{mg}{h}}$

$f'(2) \approx -0{,}64$ (mg/h) $\Rightarrow$ — " — $\underline{0{,}64 \frac{mg}{h}}$