1) $\alpha \in \left[0, \frac{\pi}{2}\right]$ $2\cos^2\alpha + \cos\alpha - 1 = 0$

$\Rightarrow u = \cos\alpha$? $\sin\alpha$?

$$2u^2 + u - 1 = 0$$

$$u = \frac{-1 \pm \sqrt{1^2 - 4 \cdot 2 \cdot (-1)}}{2 \cdot 2}$$

$$u = -\frac{1}{4} \pm \frac{\sqrt{9}}{4} = -\frac{1}{4} \pm \frac{3}{4} \begin{cases} 2/4 = 1/2 \\ -4/4 = -1 \end{cases}$$

$\cos\alpha = -1 \Rightarrow \alpha = 180^\circ \rightarrow \sin\alpha = 0$

$\cos\alpha = 1/2 \Rightarrow \alpha = 60^\circ \rightarrow \sin\alpha = \frac{\sqrt{3}}{2}$

C

(e) $y = x^2 + 2x$ door O

rechte door O → rico $9/4$

$\Rightarrow y = \frac{9}{4}x$

y-coördinaat snijpunt?

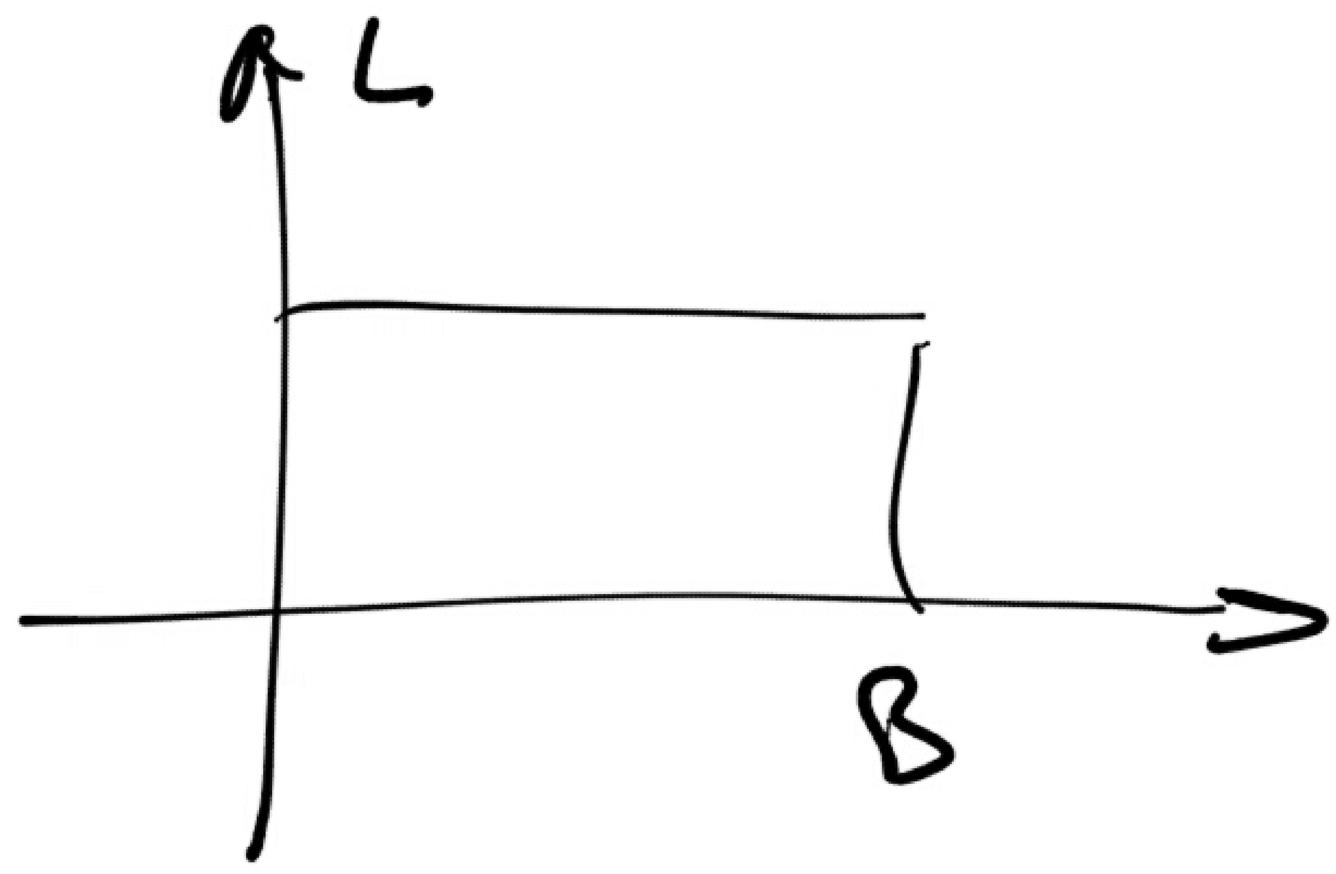
$\frac{9}{4}\cancel{x} = x^{\cancel{2}} + 2\cancel{x}$ $(x \neq 0)$

$x = \frac{9}{4} - 2 = \frac{9}{4} - \frac{8}{4} = \frac{1}{4}$

$y = \frac{9}{4}x = \frac{9}{4} \cdot \frac{1}{4} = \frac{9}{16}$ D

③ max opp rechthoek $L \times B$?

$$L = \frac{720 - 18B}{5}$$



$$L = 144 - \frac{18}{5} B$$

$$O = L.B = 144.B - \frac{18}{5} B^2$$

maximum → afgeleide = 0

$$O' = 144 - 2.\frac{18}{5} B = 0$$

$$\Rightarrow 144 = \frac{36}{5} B$$

$$\Rightarrow B = \frac{144.5}{36} = 4.5 = 20$$

$$\Rightarrow L = 144 - \frac{18.20}{5} = 144 - 18.4$$

$$= 144 - 72 = 72$$

$$O = L.B = 72.20 = 1440$$

B

(4) $\frac{T}{M} = \frac{3}{2}$ en $\frac{T/2}{M-4} = \frac{7}{8}$

$$2T = 3M \qquad 8\frac{T}{2} = 7(M-4)$$

$$T = \frac{3}{2}M \qquad 4T = 7M - 28$$

$$4\left(\frac{3}{2}M\right) = 7M - 28$$

$$6M = 7M - 28 \Rightarrow M = 28$$

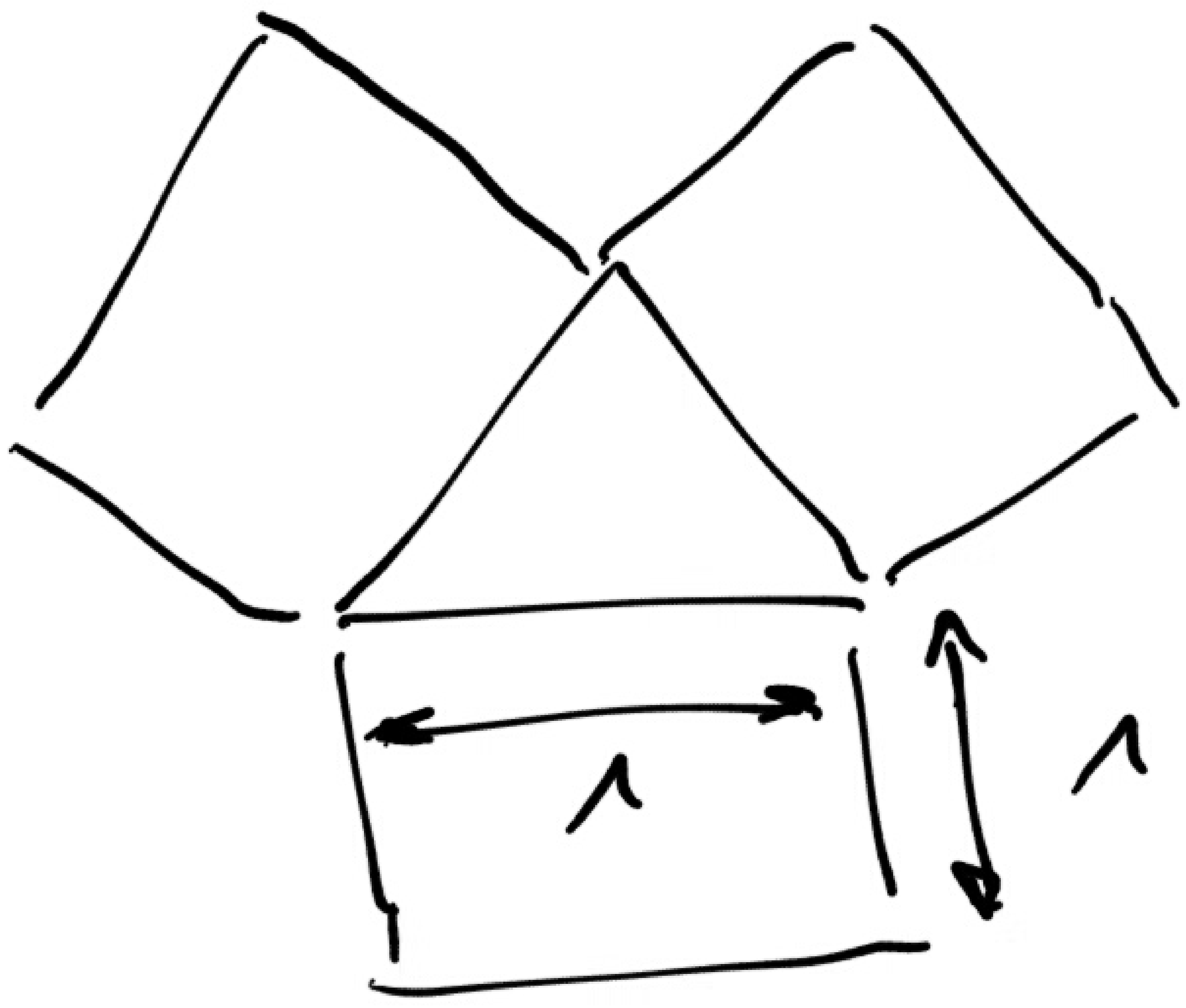
$$T = \frac{3}{2}M = \frac{3}{2}28 = 42$$

$$\frac{T}{2} = 21 \qquad M - 4 = 24$$

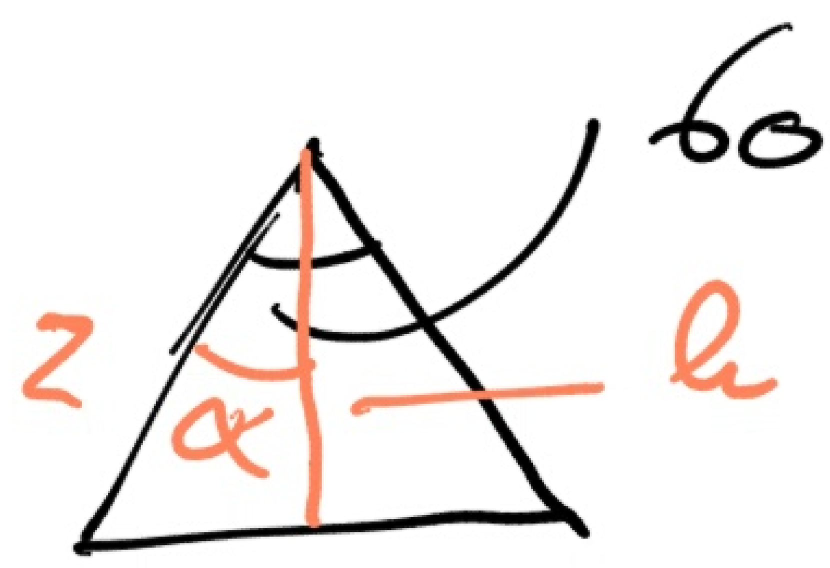
$$21 + 24 = 45$$

B

(5)



Totale apperolatte?



$$3 \cdot z^2 + \frac{b \cdot h}{2}$$

$$h = z \cdot \cos\alpha$$

$$h = 1 \cdot \cos 30^\circ$$

$$= \frac{\sqrt{3}}{2}$$

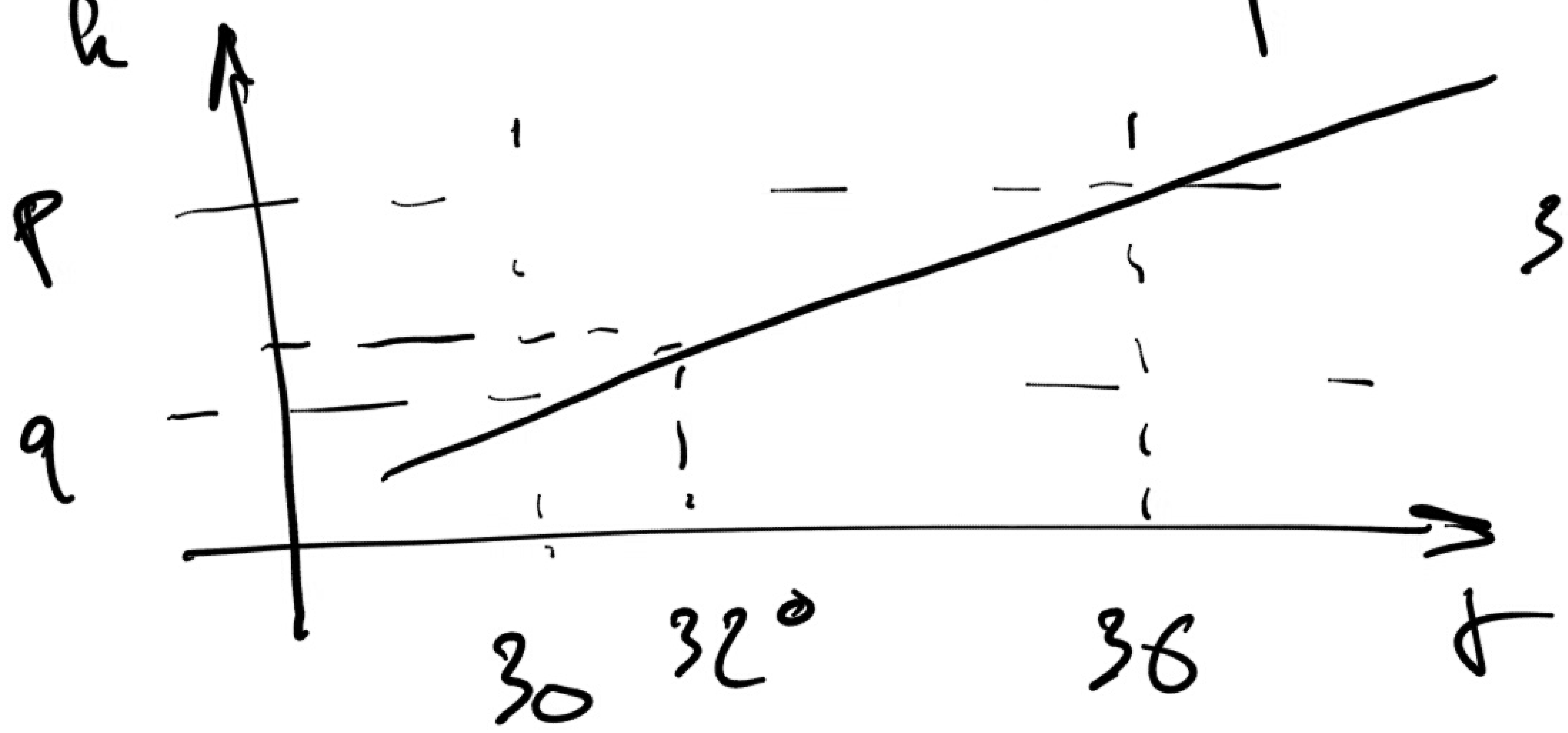
$$\Downarrow$$

$$3 \cdot 1^2 + 1 \cdot \frac{\sqrt{3}}{2} \cdot \frac{1}{2} = 3 + \frac{\sqrt{3}}{4}$$

$$= \frac{\sqrt{3}}{4}\left(1 + 4\sqrt{3}\right)$$

A

⑥ $36^\circ \rightarrow p$ lineair verband
$30^\circ \rightarrow q$ tussen hartslag en temperatuur



$32^\circ \rightarrow ?$

$$\text{rico} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{p-q}{36-30} = \frac{p-q}{6}$$

vgl rechte : $y = ax + \underline{b}$

$$q = \frac{p-q}{6} \cdot 30 + b = 5p - 5q + b$$

$$\Rightarrow b = -5p + 5q + q = 6q - 5p$$

$$h = \frac{p-q}{6} \cdot 32 + (6q - 5p)$$

$$= \frac{32p - 32q + 36q - 30p}{6}$$

$$= \frac{2p + 4q}{6} = \frac{p + 2q}{3}$$

D

7 $\begin{bmatrix} 0 & 1 \\ x & y \end{bmatrix} \begin{bmatrix} a & b \\ -a & b \end{bmatrix} = \begin{bmatrix} -a & b \\ 2a & 3b \end{bmatrix}$

$\begin{bmatrix} 0-a & 0+b \\ ax-ay & bx+by \end{bmatrix} = \begin{bmatrix} -a & +b \\ 2a & 3b \end{bmatrix}$

$ax - ay = 2a$

$bx + by = 3b$

delen

$\dfrac{\cancel{a}x - \cancel{a}y}{\cancel{b}x + \cancel{b}y} = \dfrac{2\cancel{a}}{3\cancel{b}}$

$\Rightarrow 3x - 3y = 2x + 2y$

$\Rightarrow 3x - 2x = 2y + 3y$

$x = 5y$

D

(8) $f(x) = \ln(e^x + 2)$

? Snijpunt raaklijn in $x = \ln(2)$ en de rechte met vgl $y = \ln(2)$.

↳ horizontale lijn

$f(\ln(2)) = \ln(e^{\ln 2} + 2) = \ln 4 = 2\ln 2$

$\frac{dy}{dx} = \frac{dy}{du} \cdot \frac{du}{dx}$ $\quad u = e^x + 2$

$du = e^x$

$\frac{dy}{du} = (\ln u)' = \frac{1}{u}$

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

$f'(\ln(2)) = \frac{e^{\ln 2}}{e^{\ln 2} + 2} = \frac{2}{4} = \frac{1}{2} = \text{rico}$

$y = ax + b \Rightarrow 2\ln 2 = \frac{1}{2} \cdot \ln 2 + b$

$\Rightarrow \frac{4}{2}\ln 2 - \frac{1}{2}\ln 2 = b = \frac{3}{2}\ln 2$

$(-\ln 2, \ln 2)$

A

$y = \frac{1}{2}x + \frac{3}{2}\ln 2$

SP $\frac{1}{2}x + \frac{3}{2}\ln 2 = \ln(2) = y$

$\frac{1}{2}x = \frac{2}{2}\ln 2 - \frac{3}{2}\ln 2 = -\frac{1}{2}\ln 2 \Rightarrow x = -\ln 2$

⑨ $f(x) = x^2 \cdot \ln x \qquad g(x) = 2x^2 - 5x + 1$

RL $\quad Q(1, f(1)) \perp P(a, g(a))$

? $g(a)$

$f(1) = 1^2 \cdot \ln 1 = 0$

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

$f'(1) = 2 \cdot 1 \ln 1 + 1 = 0 + 1 = 1 = $ nico

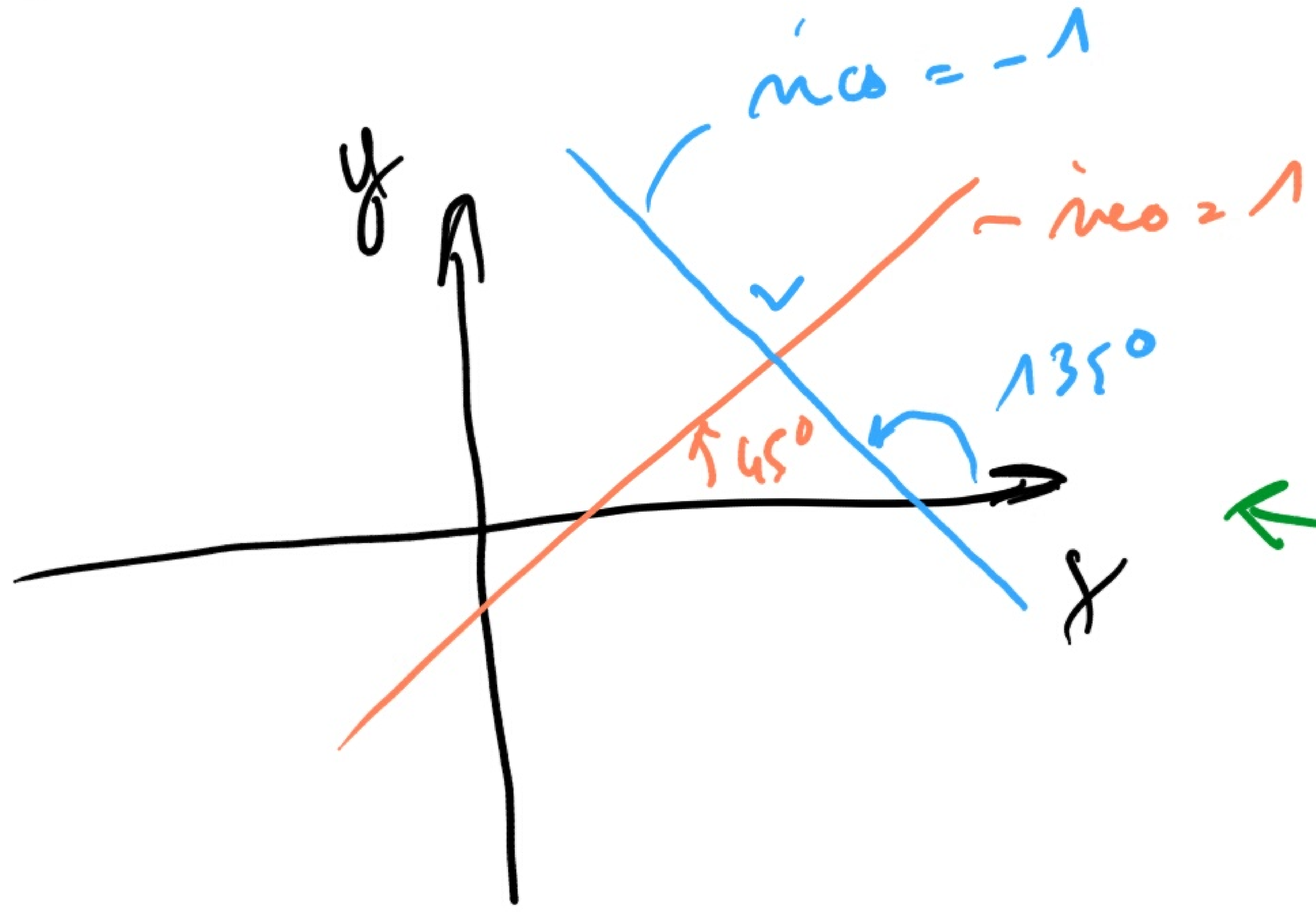
$\Rightarrow \perp \rightarrow$ nico $= -1$ $\quad$ nico

$g'(x) = 4x - 5 \Rightarrow g'(a) = -1$

$\Rightarrow 4a - 5 = -1 \Rightarrow 4a = -1 + 5$

$\Rightarrow a = 1$

$g(1) = 2 \cdot 1^2 - 5 \cdot 1 + 1 = 2 - 5 + 1 = -2$



A

10 $f(x) = |5 - |3 - x||$

$\Rightarrow$ altijd +

$\Rightarrow$ minimum $= 0$

$f(x) = 0 \rightarrow |5 - |\pm 5||$

$3 - x = \pm 5$

$3 - (-2) \rightarrow \boxed{x = -2}$

$3 - 8 \rightarrow \boxed{x = +8}$

maximum als $\underbrace{|3 - x|}_{} = 0$

$\hookrightarrow$ altijd + $\rightarrow$ min $= 0$

$\Rightarrow$ max als $\boxed{x = 3}$

Geen extremum in +2 !

B