

$$\cos \alpha = \frac{e}{d}$$

$$\Rightarrow e = \cos \alpha \cdot d$$

$$\sin \beta = \frac{x}{e}$$

$$\Rightarrow x = \sin \beta \cdot e$$

$$= \sin \beta \cdot \cos \alpha \cdot d$$

$$= \sin(28^\circ) \cdot \cos(24^\circ) \cdot 80$$

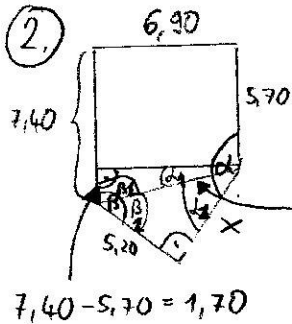
$$\approx \underline{\underline{34,31 \text{ mm}}}$$

$$\tan \beta = \frac{x}{y}$$

$$\Rightarrow y = \frac{x}{\tan \beta}$$

$$= \frac{34,31}{\tan(28^\circ)}$$

$$\approx \underline{\underline{64,53 \text{ mm}}}$$



$$\sqrt{6,90^2 + 1,70^2} = \sqrt{50,5} \approx 7,11$$

$$x = \sqrt{7,11^2 - 5,20^2} = \sqrt{23,5121} \approx \underline{\underline{4,85}}$$

$$\tan(\beta_1) = \frac{6,90}{1,70} \Rightarrow \beta_1 \approx 76,16^\circ$$

$$\Rightarrow \alpha_1 = 180^\circ - 90^\circ - \beta_1$$

$$= 13,84^\circ$$

$$\cos(\beta_2) = \frac{5,20}{7,11} \Rightarrow \beta_2 \approx 43^\circ$$

$$\Rightarrow \alpha_2 = 180^\circ - 90^\circ - \beta_2$$

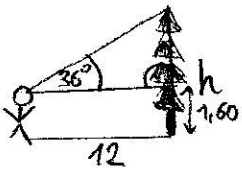
$$= 47^\circ$$

$$\alpha = \alpha_1 + \alpha_2 + 90^\circ = 13,84^\circ + 47^\circ + 90^\circ = \underline{\underline{150,84^\circ}}$$

$$\beta = \beta_1 + \beta_2 = 76,16^\circ + 43^\circ = \underline{\underline{119,16^\circ}}$$
 (alternativ: Winkelsumme im Fünfeck =  $540^\circ$ )

$$A = 6,90 \cdot 5,70 + \frac{6,90 \cdot 1,70}{2} + \frac{5,20 \cdot 4,85}{2} = 39,33 + 5,865 + 12,61 \approx \underline{\underline{57,81 \text{ m}^2}}$$

③



$$\tan(36^\circ) = \frac{h - 1,60}{12}$$

$$\Rightarrow h = 1,60 + 12,00 \cdot \tan(36^\circ) \approx \underline{\underline{10,32 \text{ m}}}$$

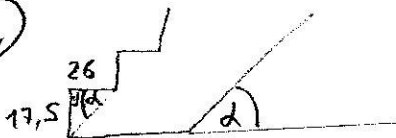
④



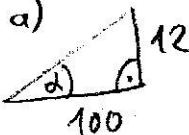
$$\cos(75^\circ) = \frac{x}{3,80}$$

$$\Rightarrow x = \cos(75^\circ) \cdot 3,80 \approx \underline{\underline{0,98 \text{ m}}}$$

⑤



$$\tan(\alpha) = \frac{17,5}{26} \Rightarrow \alpha \approx \underline{\underline{33,94^\circ}}$$

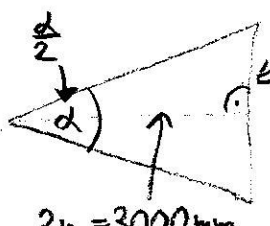
6. a)   $\tan(\alpha) = \frac{12}{100} \Rightarrow \underline{\alpha \approx 6,84^\circ}$

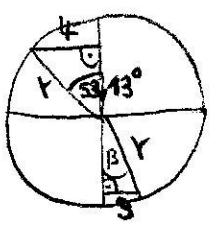
b)  $\tan(\alpha) = \frac{100}{100} = 1 \Rightarrow \underline{\alpha = 45^\circ}$

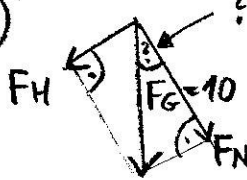
7.  $\tan(23,6^\circ) = \frac{28,9}{\overline{TS}} \Rightarrow \overline{TS} = \frac{28,9}{\tan(23,6^\circ)} \approx 66,15 \text{ m}$

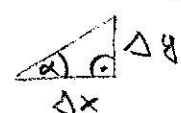
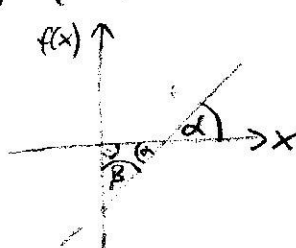
$\tan(72,5^\circ) = \frac{\overline{AT}}{66,15} \Rightarrow \overline{AT} = \tan(72,5^\circ) \cdot 66,15 \approx 209,8 \text{ m}$

$\overline{AB} = \overline{AT} - 28,9 \text{ m} = \underline{180,9 \text{ m}}$

8.   $\frac{3}{2} = 1,5 \text{ mm} \quad \tan\left(\frac{\alpha}{2}\right) = \frac{1,5}{3000}$   
 $\Rightarrow \frac{\alpha}{2} \approx 0,029 \Rightarrow \underline{\alpha \approx 0,06^\circ}$

9.   $\sin(53,13^\circ) = \frac{4}{r} \Rightarrow r = \frac{4}{\sin(53,13^\circ)} \approx 5 \text{ cm}$   
 $\sin(\beta) = \frac{3}{5} \Rightarrow \underline{\beta \approx 36,87^\circ}$

10.   $? = 90^\circ - \beta = \alpha = 30^\circ$   
 a)  $\sin(30^\circ) = \frac{F_H}{10} \Rightarrow F_H = \sin(30^\circ) \cdot 10 = \underline{5 \text{ N}}$   
 b)  $\cos(30^\circ) = \frac{F_N}{10} \Rightarrow F_N = \cos(30^\circ) \cdot 10 \approx \underline{8,66 \text{ N}}$

11.  $f(x) = 3x - 2$  zur Erinnerung:  $f(x) = m \cdot x + b$  y-Achsenabschnitt irrelevant!  
 Steigung  $m = \frac{\Delta y}{\Delta x}$    
  
 a) x-Achse:  $\tan(\alpha) = 3 \Rightarrow \underline{\alpha \approx 71,56^\circ}$   
 b) y-Achse:  $\beta = 180^\circ - 90^\circ - \alpha = \underline{18,44^\circ}$