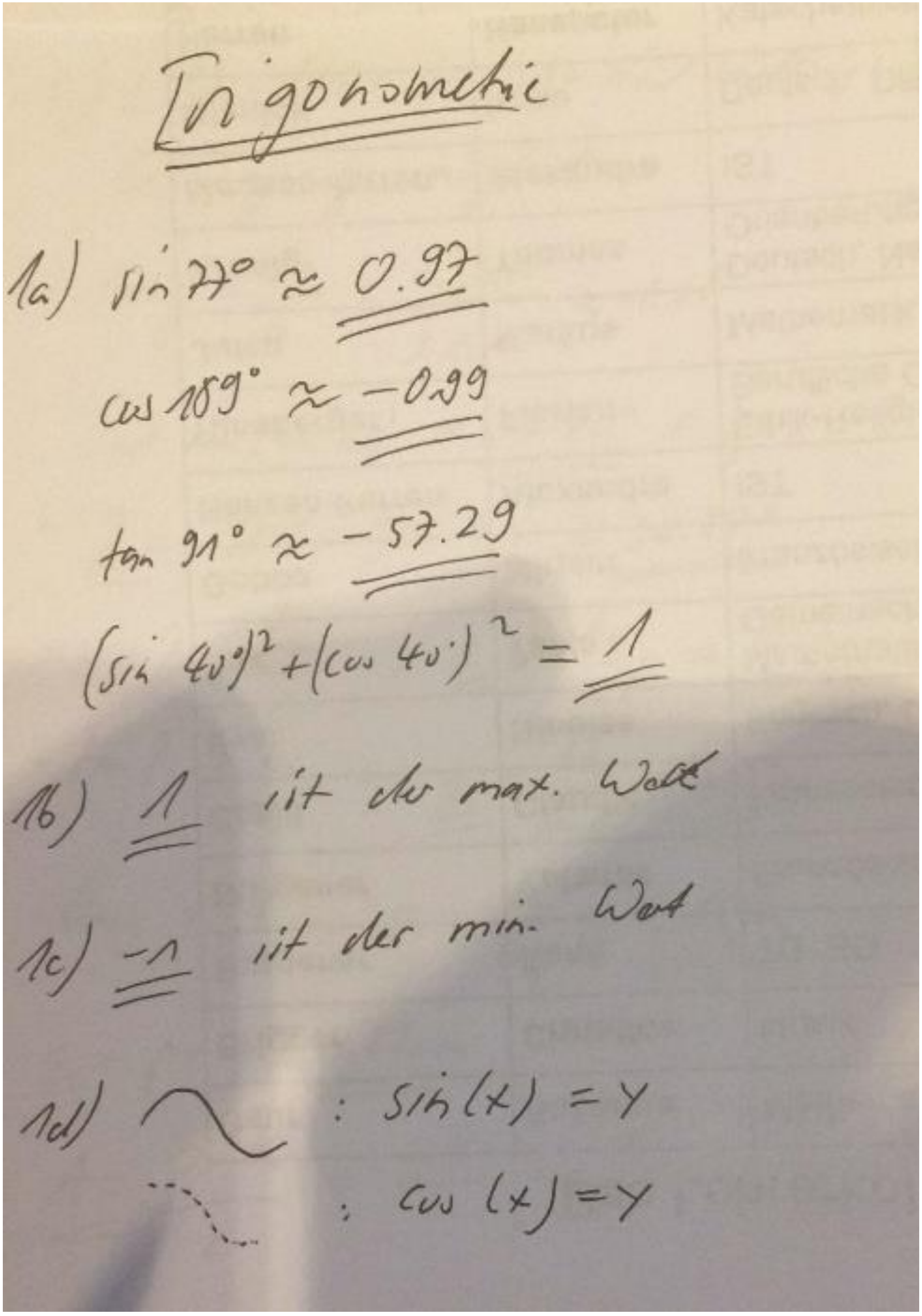
Die Zusatzblätter mit den Titeln

Winkelfunktionen am rechtwinkligen Dreieck 2

und

Winkelfunktionen am rechtwinkligen Dreieck 3

sind sehr anspruchsvoll für uns. NICHT MACHEN!



Trigonometrie

1a) $\sin 77° \approx 0.97$

$\cos 189° \approx -0.99$

$\tan 91° \approx -57.29$

$(\sin 40°)^2 + (\cos 40°)^2 = 1$

1b) 1 ist der max. Wert

1c) -1 ist der min. Wert

1d) : $\sin(x) = y$

: $\cos(x) = y$

2) 3 △ Dreiecke, also sind viele Lösungswege möglich.

- $\tan\gamma = \frac{h_a}{p} = \frac{5.2cm}{3.1cm} \approx 1.68$

2nd tan (1.68) $\approx \underline{\underline{59.20°}} = \gamma$

- $\underline{\underline{\beta}} = 180° - 90° - \gamma \cong \underline{\underline{30.80°}}$

- $\sin\beta = \frac{h_a}{c} \rightarrow \underline{\underline{c}} = \frac{h_a}{\sin\beta} \approx \underline{\underline{10.15cm}}$

- $\tan\beta = \frac{h_a}{q} \rightarrow \underline{\underline{q}} = \frac{h_a}{\tan\beta} \approx \underline{\underline{8.72cm}}$

- $\tan\gamma = \frac{h_a}{p} \rightarrow \underline{\underline{p}} = \frac{h_a}{\tan\gamma} \approx \underline{\underline{3.10cm}}$

$\underline{\underline{a}} = p + q \cong \underline{\underline{11.82cm}}$

$\underline{\underline{A}} = \frac{a \cdot h_a}{2} = \frac{11.82cm \cdot 5.2cm}{2} \approx \underline{\underline{30.73cm^2}}$

3a) $\sin\alpha = \dfrac{a}{c}$

$\cos\beta = \dfrac{a}{c}$

$\sin\alpha = \cos(90-\alpha)$

$\beta = 90-\alpha$

b) $\sin\beta = \dfrac{b}{c}$

$\cos\alpha = \dfrac{b}{c}$

$\sin\beta = \cos(90-\beta)$

$\alpha = 90-\beta$

c) sin eines Winkels = cos (90° − Winkel)

cos eines Winkels = sin (90° − Winkel)

4) a) $\tan \alpha = \dfrac{29cm}{98cm} \approx 0.30$

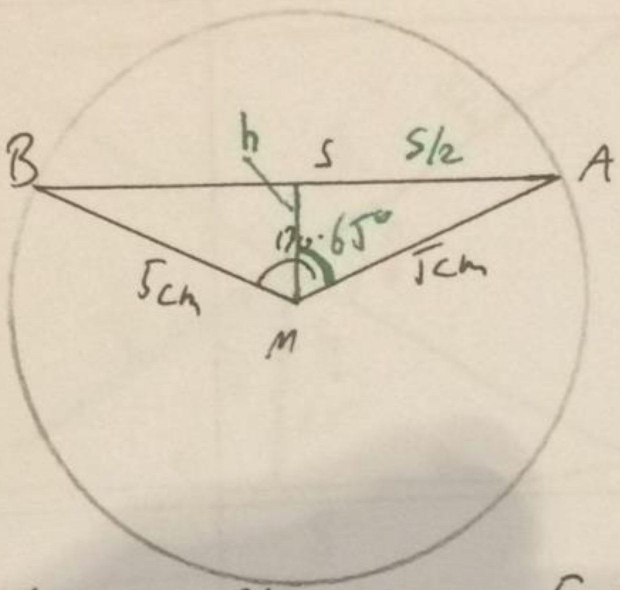
$\boxed{2nd} \tan(0.30) \approx 16.48^\circ = \alpha$

b) $V = G \cdot h$

$= \dfrac{29cm \cdot 98cm}{2} \cdot 70cm$

$\approx 99'470 cm^3$

5) a)



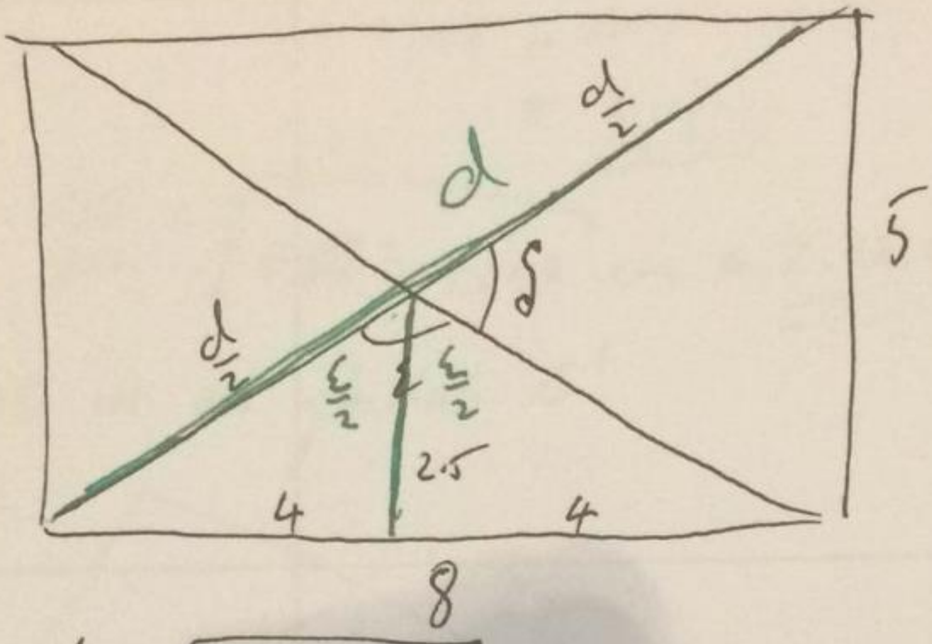
$\bullet\ \sin 65° = \dfrac{s/2}{5} \rightarrow \underline{\underline{\dfrac{s}{2}}} = 5 \cdot \sin 65° \approx \underline{\underline{4.53cm}}$

$\rightarrow \underline{\underline{s}} = 2 \cdot 4.53cm \approx \underline{\underline{9.06cm}}$

b) $\bullet\ h = \sqrt{5^2 - \left(\frac{s}{2}\right)^2}$ cm $\approx \underline{\underline{2.11cm}}$

$\bullet\ A = \dfrac{s \cdot h}{2} = \dfrac{9.06cm \cdot 2.11cm}{2} \approx \underline{\underline{9.57cm}}$

6)



$$d = \sqrt{5^2 + 8^2}\,\text{cm} \approx \underline{\underline{9.43\text{cm}}}$$

$$\cos\left(\frac{\varepsilon}{2}\right) = \frac{2.5\text{cm}}{4.72\text{cm}} \rightarrow \frac{\varepsilon}{2} \cong 57.99^\circ$$

$$\rightarrow \underline{\underline{\varepsilon}} \approx \underline{\underline{115.99^\circ}}$$

$$\rightarrow \underline{\underline{\delta}} = 180^\circ - \varepsilon$$

$$\approx \underline{\underline{64.01^\circ}}$$

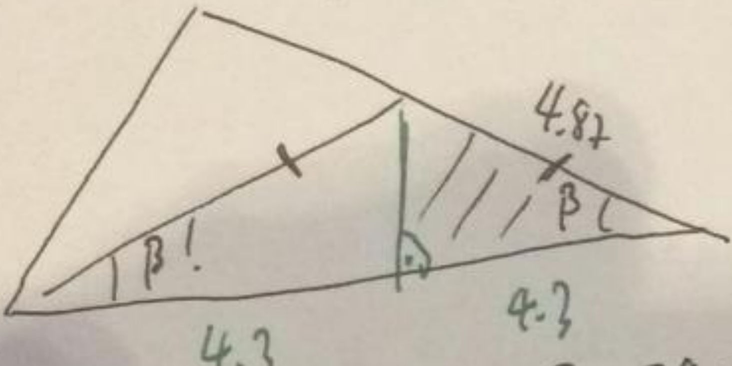
7a) $\cos 34^\circ = \frac{AC}{4.87cm}$

$\rightarrow AC = \cos 34^\circ \cdot 4.87cm$

$\approx \underline{\underline{4.04cm}}$

$\underline{\underline{CD}} = \sqrt{4.87^2 - 4.04^2}\ cm \approx \underline{\underline{2.72cm}}$

b) ABD ist ein gleichsch. Δ!



$\cos \beta = \frac{4.3cm}{4.87cm} \rightarrow \beta = \underline{\underline{28.00^\circ}}$

c) $\alpha =$ ~~[illegible]~~ $+ \underline{\underline{28^\circ}}$

A1)

a1) $\sin\alpha = \frac{e}{f}$

$\sin\beta = \frac{d}{f}$

a2) $\sin\alpha = \frac{l}{h}$ $\qquad \sin\beta = \frac{m}{h}$

b1) $\cos\alpha = \frac{d}{f}$ $\qquad \cos\beta = \frac{e}{f}$

b2) $\cos\alpha = \frac{m}{h}$ $\qquad \cos\beta = \frac{l}{h}$

c1) $\tan\alpha = \frac{e}{d}$ $\qquad \tan\beta = \frac{d}{e}$

c2) $\tan\alpha = \frac{l}{m}$ $\qquad \tan\beta = \frac{m}{e}$

A_2)

- $\sin\alpha = \dfrac{a}{c}$

  $\rightarrow a = \sin\alpha \cdot c$

  $\rightarrow c = \dfrac{a}{\sin\alpha}$

- $\sin\beta = \dfrac{b}{c}$

  $\rightarrow b = c \cdot \sin\beta$

  $\rightarrow c = \dfrac{b}{\sin\beta}$

- $\cos\alpha = \dfrac{b}{c}$ $\rightarrow b = c \cdot \cos\alpha$

  $\rightarrow c = \dfrac{b}{\cos\alpha}$

- $\cos\beta = \dfrac{a}{c}$ $\rightarrow a = c \cdot \cos\beta$

  $\rightarrow c = \dfrac{a}{\cos\beta}$

- $\tan\alpha = \dfrac{a}{b}$ $\rightarrow a = b \cdot \tan\alpha$

  $\rightarrow b = \dfrac{a}{\tan\alpha}$

- $\tan\beta = \dfrac{b}{a}$ $\rightarrow b = a \cdot \tan\beta$

  $\rightarrow a = \dfrac{b}{\tan\beta}$

A3) a) $\sin 30 = \frac{a}{72cm}$

$\rightarrow \underline{\underline{a}} = \sin 30 \cdot 72cm \approx \underline{\underline{36.00cm}}$

b) $\sin 50 = \frac{b}{80cm}$

$\rightarrow \underline{\underline{b}} = \sin 50 \cdot 80cm = \underline{\underline{61.28cm}}$

c) $\tan 30^\circ = \frac{a}{57cm}$

$\rightarrow a = \tan 30^\circ \cdot 57cm \approx \underline{\underline{32.91cm}}$

d) $\tan 60^\circ = \frac{35cm}{b}$

$\rightarrow b = \frac{35cm}{\tan 60} \approx \underline{\underline{20.21cm}}$

e) $\cos 50^\circ = \frac{a}{71cm}$

$\rightarrow a = 71cm \cdot \cos 50^\circ \approx \underline{\underline{45.64cm}}$

f) $\cos 30^\circ = \frac{b}{94cm}$

$\rightarrow b = \cos 30^\circ \cdot 94cm \approx \underline{\underline{81.41cm}}$