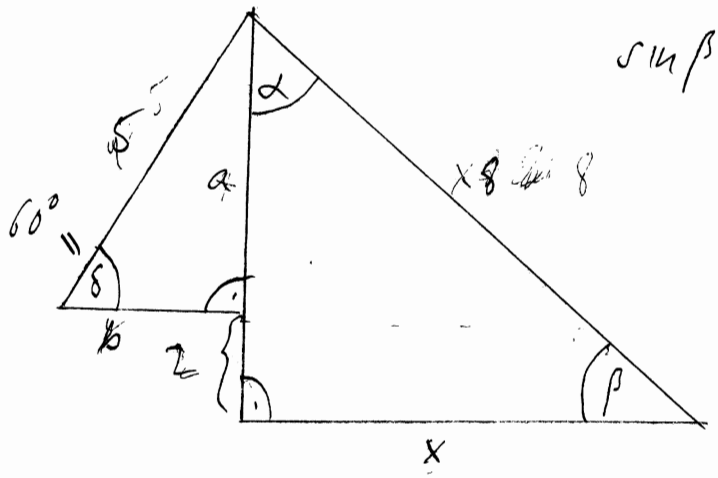
1)



$\sin 60 = \frac{a}{5} \Rightarrow a = 5 \sin 60 = 4{,}33\,a$

$\sin\beta = \frac{a+2}{8} \Rightarrow \beta = \sin^{-1}\left(\frac{a+2}{8}\right) = 52{,}3°$

$\alpha = 90 - \beta = 39{,}7°$

$\cos\beta = \frac{x}{8} \Rightarrow x = 8\cos\beta = 4{,}89\,a$

$\cos 60 = \frac{b}{5} = b = 5\cos 60 = 2{,}5\,a$

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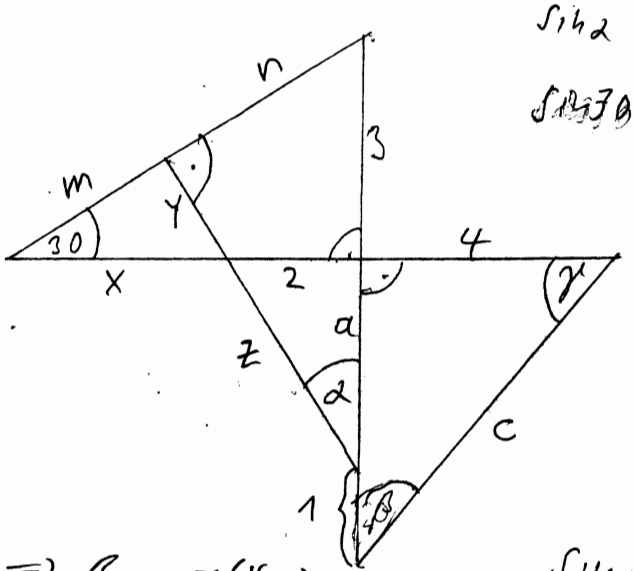
2)



$\alpha = 30$ (Scheitelw. u. WS)

$\tan\alpha = \frac{2}{a} \Rightarrow a = \frac{2}{\tan 2} = 3{,}46\,cm$

$\sin\alpha = \frac{n}{a+1} \Rightarrow n = (a+3)\sin\alpha = 3{,}23\,a$

$\sin 30 = \frac{3}{m+n} \Rightarrow m = \frac{3}{\sin 30} - n$

$= 2{,}77\,cm$

$\cos 30 = \frac{m}{x} \Rightarrow x = \frac{m}{\cos 30}$

$= 3{,}2\,a$

$\sin 30 = \frac{y}{x} \Rightarrow y = x\sin 30$

$= \frac{3{,}2}{2} = 1{,}6\,cm$

$\sin\alpha = \frac{2}{z} \Rightarrow z = \frac{2}{\sin\alpha} = 4\,cm$

$\tan\beta = \frac{4}{a+1} \Rightarrow \beta = \tan^{-1}\left(\frac{4}{a+1}\right) = 41{,}19°$

$\gamma = 90 - \beta = 48{,}11°$

$\sin\beta = \frac{4}{c} \Rightarrow c = \frac{4}{\sin\beta} = 5{,}99 \approx 6\,cm$

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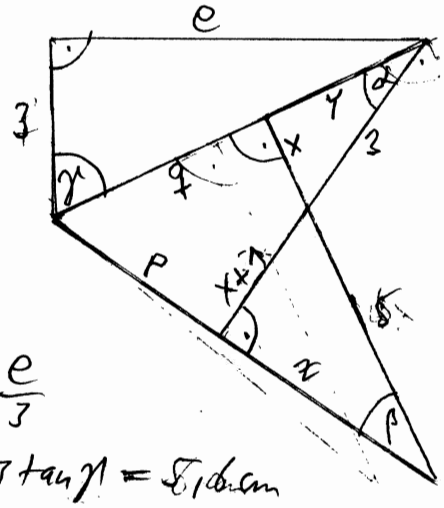
3)



$\alpha = \beta$ (Scheitelwinkel u. WS im $\triangle$)

$\frac{x}{3} = \sin\alpha = \frac{x+1}{5} \Leftrightarrow 5x = 3x+3 \Leftrightarrow 2x = 3 \Leftrightarrow x = 1{,}5$

$\Rightarrow \alpha = \sin^{-1}\left(\frac{x}{3}\right) = \sin^{-1}\left(\frac{1}{2}\right) = 30°$

$\cos\alpha = \frac{4}{3} \Rightarrow 4 = 3\cos\alpha = 2{,}6\,cm$

$\frac{z}{5} = \cos\beta \Rightarrow z = 5\cos\beta = 4{,}33\,cm$

$\tan\alpha = \frac{p}{x+4} \Rightarrow p = (x+4)\tan\alpha = 3{,}18\,cm$

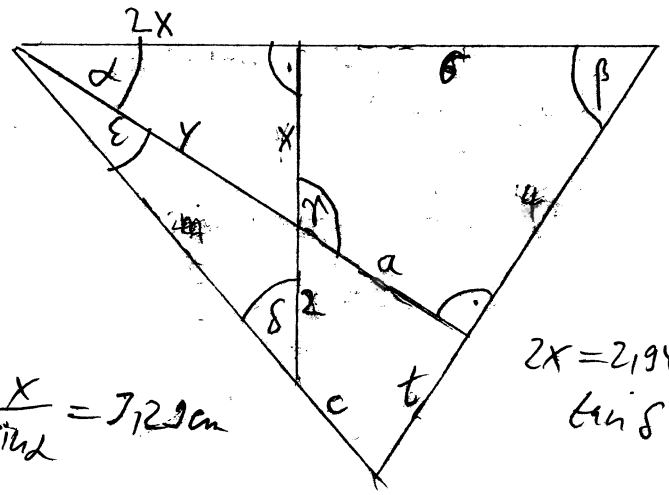
$\tan\beta = \frac{q}{x+5} \Rightarrow q = (x+5)\tan\beta = 3{,}75\,cm$

$\cos\gamma = \frac{3}{q+4} \Rightarrow \gamma = \cos^{-1}\left(\frac{3}{q+4}\right) = 61{,}81°$

$\tan\gamma = \frac{e}{3}$

$\Rightarrow e = 3\tan\gamma = 5{,}16\,cm$

4)



$\tan\alpha = \frac{x}{2x} = \frac{1}{2} \Rightarrow \alpha = \tan^{-1}$

$\alpha = \tan^{-1}(\frac{1}{2}) = 26{,}57°$

$\beta = 90 - 26{,}57 = 63{,}43°$

$\gamma = \alpha + 90 = 116{,}57°$

$\sin\alpha = \frac{4}{2x+6} \Leftrightarrow 2x+6 = \frac{4}{\sin\alpha}$

$\Rightarrow x = \frac{1}{2}\left(\frac{4}{\sin\alpha} - 6\right) = 1{,}47\text{cm}$

$2x = 2{,}94\text{cm}$

$\sin\alpha = \frac{x}{y}$

$\Rightarrow y = \frac{x}{\sin\alpha} = 3{,}29\text{cm}$

$\tan\delta = \frac{2x}{x+2} \Rightarrow \delta = \tan^{-1}\left(\frac{2x}{x+2}\right) = 40{,}27°$

$\varepsilon = 180 - \delta - \gamma = 23{,}16°$

$\tan\beta = \frac{a+y}{y} \Rightarrow a = y\tan\beta - y$

$a = 4{,}71\text{cm}$

$\cos\delta = \frac{x+2}{m} \Rightarrow m = \frac{x+2}{\cos\delta} = 4{,}55\text{cm}$

$a + y = 8\text{cm}$

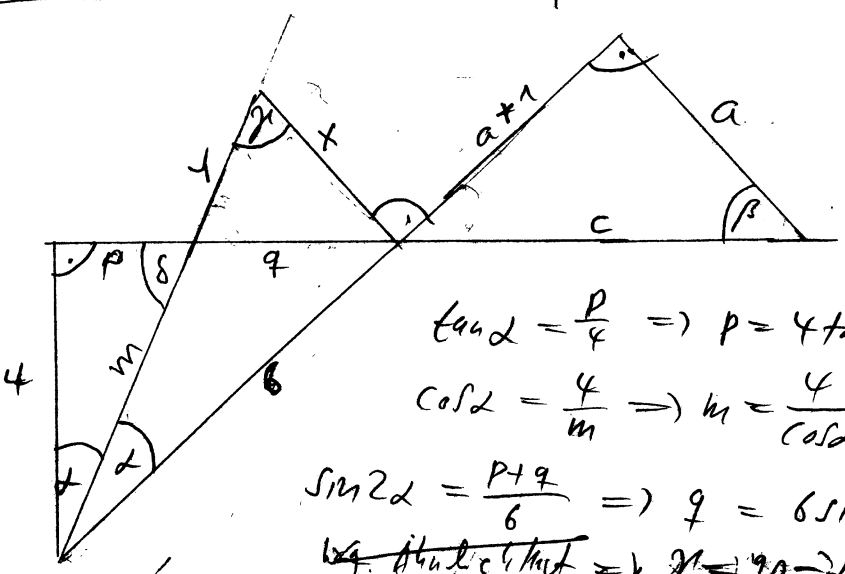
$\tan\varepsilon = \frac{t}{a+y} \Rightarrow t = (a+y)\tan\varepsilon$

$t = 3{,}42\text{cm}$

$\cos\varepsilon = \frac{a+y}{m+c} \Rightarrow c = \frac{a+y}{\cos\varepsilon} - m$

$c = 4{,}15\text{cm}$

5)



$\cos 2\alpha = \frac{4}{6} = \frac{2}{3}$

$\alpha = \frac{1}{2}\cos^{-1}(\frac{2}{3}) = 24{,}09°$

$2\alpha = 48{,}18° = \beta$

$\tan\alpha = \frac{p}{4} \Rightarrow p = 4\tan\alpha = 1{,}79\text{cm}$

$\cos\alpha = \frac{4}{m} \Rightarrow m = \frac{4}{\cos\alpha} = 4{,}38\text{cm}$

$\sin 2\alpha = \frac{p+q}{6} \Rightarrow q = 6\sin 2\alpha - p = 2{,}68\text{cm}$

~~wg. Ähnlichkeit~~ $\Rightarrow \gamma = 90 - \alpha = \delta \Rightarrow x = q = 2{,}68\text{cm}$

wg. Ähnlichkeit: $\beta = 2\alpha$

$\tan\beta = \frac{a+1}{a} \Rightarrow a\tan\beta = a+1 \Leftrightarrow a(\tan\beta - 1) = 1$

$\Leftrightarrow a = \frac{1}{\tan\beta - 1} = 8{,}5\text{cm}$

Ähnlichkeit: $\frac{c}{a} = \frac{6}{4} = \frac{3}{2} \Rightarrow c = \frac{3a}{2} = 12{,}75\text{cm}$

$\cos\alpha = \frac{6}{m+4} \Rightarrow 4 = \frac{6}{\cos\alpha} - m = 2{,}79\text{cm}$