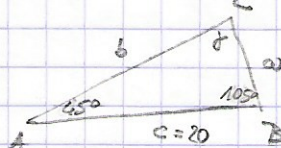


Devoir 9:

Ex) $c = 20, \alpha = 45^\circ, \beta = 105^\circ$



$b, \alpha, \gamma = ?$

$\alpha + \beta + \gamma = 180^\circ$

$\gamma = 180^\circ - (45^\circ + 105^\circ)$

$\gamma = 180 - 150 = \underline{30^\circ}$

$\frac{c}{\sin \gamma} = \frac{a}{\sin \alpha}$

$a = \frac{c \cdot \sin \alpha}{\sin \gamma} = \frac{20 \cdot \sin 45^\circ}{\sin 30^\circ} = \underline{28,3}$

$\frac{c}{\sin \gamma} = \frac{b}{\sin \beta}$

$b = \frac{c \cdot \sin \beta}{\sin \gamma} = \frac{20 \cdot \sin 105^\circ}{\sin 30^\circ} = \underline{38,64}$

Ex) $a = 51,32, c = 34,76, \beta = 126^\circ 12'$

$b, \alpha, \gamma = ?$

$b^2 = a^2 + c^2 - 2ac \cdot \cos \beta$

$b^2 = 51,32^2 + 34,76^2 - 2 \cdot 51,32 \cdot 34,76 \cdot \cos 126^\circ 12' = 5949,19$

$b = \sqrt{5949,19} = \underline{77,13}$

$\frac{a}{\sin \alpha} = \frac{b}{\sin \beta}$

$\sin \alpha = \frac{a \cdot \sin \beta}{b} = \frac{51,32 \cdot \sin 126^\circ 12'}{77,13} = 0,537$

$\alpha = 32,48^\circ$

$180^\circ = \alpha + \beta + \gamma$

$\gamma = 180^\circ - (32,48^\circ + 126^\circ 12') = 21,32^\circ$

Ex 1) a) $a = 15, b = 18, \alpha = 33^\circ, c, \beta = ?$

$\frac{a}{\sin \alpha} = \frac{b}{\sin \beta}$

$\sin \beta = \frac{\sin \alpha \cdot b}{a} = \frac{\sin 33^\circ \cdot 18}{15} = 0,654$

$\beta = 40,8^\circ$

$180^\circ = \alpha + \beta + \gamma$

$\gamma = 180^\circ - (33^\circ + 40,8^\circ) = 106,2^\circ$

$c = \frac{a \cdot \sin 106,2^\circ}{\sin 33^\circ} = \frac{15 \cdot \sin 106,2^\circ}{\sin 33^\circ} = \underline{26,14}$

b) $a = 13, b = 10, \alpha = 41^\circ, c, \beta = ?$

$a^2 = b^2 + c^2 - 2bc \cdot \cos \alpha$

$a^2 = 10^2 + 13^2 - 2 \cdot 10 \cdot 13 \cdot \cos 41^\circ = 72,76$

$a = \sqrt{72,76} = \underline{8,5}$

$\sin \beta = \frac{\sin \alpha \cdot b}{a} = \frac{\sin 41^\circ \cdot 10}{8,5} = 0,77$

$\beta = \underline{50,5^\circ}$

c) $a = 20, b = 35, c = 29, \alpha, \gamma = ?$

$a^2 = b^2 + c^2 - 2bc \cdot \cos \alpha$

$2bc \cdot \cos \alpha = -a^2 + b^2 + c^2 \quad | : 2bc$

$\cos \alpha = \frac{b^2 + c^2 - a^2}{2bc} = \frac{35^2 + 29^2 - 20^2}{2 \cdot 35 \cdot 29} = 0,821$

$\alpha = \underline{34,8^\circ}$

$\frac{a}{\sin \alpha} = \frac{c}{\sin \gamma}$

$\sin \gamma = \frac{\sin \alpha \cdot c}{a} = \frac{\sin 34,8^\circ \cdot 29}{20} = 0,828$

$\gamma = \underline{55,9^\circ}$

d) $c = 27, \alpha = 65^\circ, \gamma = 51^\circ, a, b = ?$

$\frac{c}{\sin \gamma} = \frac{a}{\sin \alpha}$

$a = \frac{c \cdot \sin \alpha}{\sin \gamma} = \frac{27 \cdot \sin 65^\circ}{\sin 51^\circ} = \underline{31,51}$

$180^\circ = \alpha + \beta + \gamma$

$\beta = 180^\circ - (51^\circ + 65^\circ) = 64^\circ$

$\frac{c}{\sin \gamma} = \frac{b}{\sin \beta} \quad b = \frac{c \cdot \sin \beta}{\sin \gamma} = \frac{27 \cdot \sin 64^\circ}{\sin 51^\circ} = \underline{31,2}$

e) $a = 11,6, c = 9, \alpha = 65^\circ 30' = 65,5^\circ, b, \beta, \gamma = ?$

$\frac{a}{\sin \alpha} = \frac{c}{\sin \gamma}$

$\sin \gamma = \frac{\sin \alpha \cdot c}{a} = \frac{\sin 65,5^\circ \cdot 9}{11,6} = 0,706$

$\gamma = \underline{44,91^\circ}$

$180^\circ = \alpha + \beta + \gamma$

$\beta = 180^\circ - (65,5^\circ + 44,91^\circ)$

$\beta = \underline{69,59^\circ}$

$\frac{a}{\sin \alpha} = \frac{b}{\sin \beta}$

$b = \frac{a \cdot \sin \beta}{\sin \alpha} = \frac{11,6 \cdot \sin 69,59^\circ}{\sin 65,5^\circ} = \underline{11,9}$

f) $a = 16,9$, $b = 26$, $c = 27,3$ $\alpha, \beta, \gamma = ?$

$$a^2 = b^2 + c^2 - 2bc \cdot \cos \alpha$$

$$\cos \alpha = \frac{b^2 + c^2 - a^2}{2bc} = \frac{26^2 + 27,3^2 - 16,9^2}{2 \cdot 26 \cdot 27,3} = 0,8$$

$$\alpha = 36,87^\circ$$

$$\frac{a}{\sin \alpha} = \frac{b}{\sin \beta}$$

$$\sin \beta = \frac{\sin \alpha \cdot b}{a} = \frac{\sin 36,87^\circ \cdot 26}{16,9} = 0,92$$

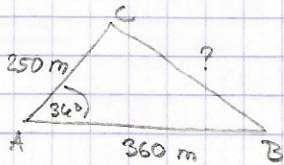
$$\beta = 67^\circ$$

$$\frac{a}{\sin \alpha} = \frac{c}{\sin \gamma}$$

$$\sin \gamma = \frac{\sin \alpha \cdot c}{a} = \frac{\sin 36,87^\circ \cdot 27,3}{16,9} = 0,969$$

$$\gamma = 75,7^\circ$$

Ex 2)



$$b = 250 \text{ m}$$

$$c = 360 \text{ m}$$

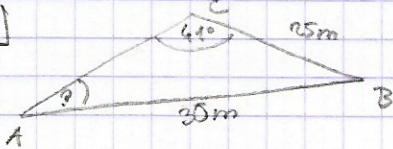
$$\alpha = 34^\circ$$

$$a^2 = b^2 + c^2 - 2bc \cdot \cos \alpha$$

$$a^2 = 250^2 + 360^2 - 2 \cdot 250 \cdot 360 \cdot \cos 34 = 42873,24$$

$$a = \sqrt{42873,24} = 207,1 \text{ m}$$

Ex 3)



$$a = 25 \text{ m}$$

$$c = 30 \text{ m}$$

$$\gamma = 41^\circ$$

$$\alpha = ?$$

$$\frac{a}{\sin \alpha} = \frac{c}{\sin \gamma}$$

$$\sin \alpha = \frac{\sin \gamma \cdot a}{c} = \frac{\sin 41^\circ \cdot 25}{30} = 33,14^\circ = 33^\circ$$