Övn nr 4 & 7-10 & 13-15

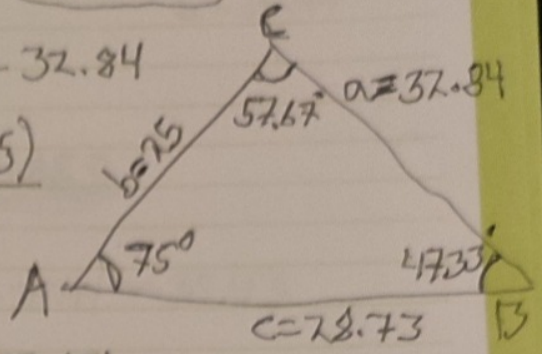
Avsnitt 3.4 Övningar sinussatsen

① $R=17$ $A=75°$ $b=25$ $a=32.84$

$\frac{a}{\sin(75)}=2\cdot 17 \Rightarrow a=\sin(75)\cdot 34=32.84$

$\frac{\sin(B)}{25}=\frac{\sin(75)}{32.84} \Rightarrow \sin(B)=\frac{25\cdot\sin(75)}{32.84}$

$\sin(B)=47.33$



$\frac{c}{\sin(57.67)}=\frac{25}{\sin(47.33)} \Rightarrow c=\frac{25\cdot\sin(57.67)}{\sin(47.33)}=28.73$

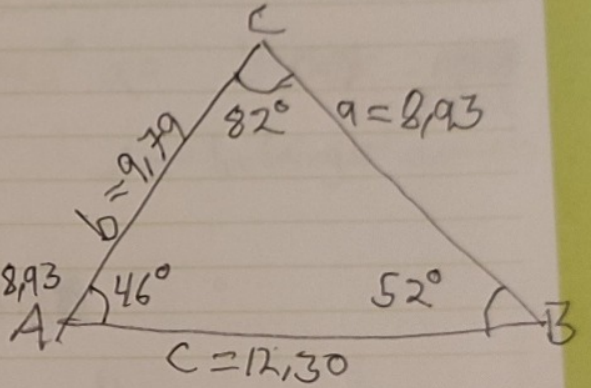
② $s=15.5$ $B=52°$ $C=82°$

$R=\frac{15.5}{\sin(46)+\sin(52)+\sin(82)}=6.21$

$\frac{a}{\sin(46)}=2\cdot 6.21 \Rightarrow a=2\cdot 6.21\cdot\sin(46)=8.93$

$\frac{b}{\sin(52)}=2\cdot 6.21 \Rightarrow b=2\cdot 6.21\cdot\sin(52)=9.79$

$\frac{c}{\sin(82)}=2\cdot 6.21 \Rightarrow c=2\cdot 6.21\cdot\sin(82)=12.30$



③ $R=25$ $B=52°$ $c=18$

$A=106.9$ $C=21.1$

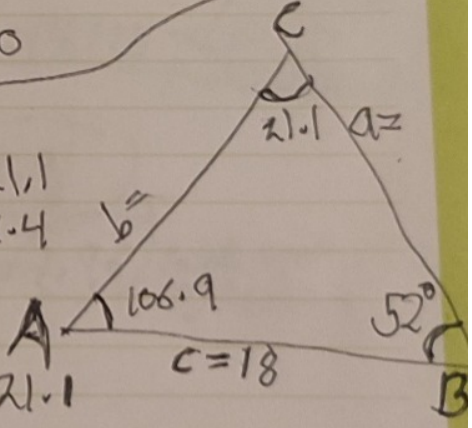
$a=47.84$ $b=39.4$

Sinussatsen $2\cdot R=50$

$\frac{18}{\sin(C)}=50 \Rightarrow \sin(C)=\frac{18}{50}=0.36 \Rightarrow \sin^{-1}(0.36)=21.1$

$\frac{b}{\sin(52)}=\frac{18}{\sin(21.1)} \Rightarrow b=\frac{18\cdot\sin(52)}{\sin(21.1)}=39.4$

$\frac{a}{\sin(106.9)}=\frac{18}{\sin(21.1)} \Rightarrow a=\frac{18\cdot\sin(106.9)}{\sin(21.1)}=47.84$



Æfing 3.4 bls 2

④ $s=45$ $A=35°$ $B=77°$ $C=68°$ $a=20.86$ $c=33.71$ $b=35.44$

$$R=\frac{45}{\sin(35)+\sin(77)+\sin(68)}=18.18$$

$$\frac{a}{\sin(35)}=36.36 \Rightarrow a=\sin(35)\cdot 36.36 = 20.855$$

$$\frac{b}{\sin(77)}=\frac{20.855}{\sin(35)} \Rightarrow b=\frac{20.86\cdot\sin(77)}{\sin(35)}=35.44 \approx 35.43$$

$$\frac{c}{\sin(68)}=\frac{20.86}{\sin(35)} \Rightarrow c=\frac{20.86\cdot\sin(68)}{\sin(35)}=33.71$$

---

⑦ $A=33°$ $B=72°$ $C=75°$ $a=$ $b=13.91$ $c=14.13$

$s=18$

so hringur ummáls

$$R=\frac{18}{\sin(33)+\sin(72)+\sin(75)}=7.312$$

$$\frac{c}{\sin(75)}=$$

$$2\cdot 7.3127=c=\sin(75)\cdot 14.624=14.125\approx 14.13$$

$$\frac{b}{\sin(72)}=$$

$$\frac{b}{\sin(72)}=14.624 \Rightarrow b=\sin(72)\cdot 14.624=13.91$$

$$\frac{a}{\sin(33)}=14.624 \Rightarrow a=\sin(33)\cdot 14.624=7.96$$ (reiknisaman sjón og í bókinni)

Acting 3.4 BIS 3

(8) $A=23^\circ$ $B=52^\circ$ $R=20$ $C=105^\circ$ $a=15.63$ $b=31.52$ $c=38.64$

$2 \cdot R = 40$

$\frac{a}{\sin(23)} = 40 \Rightarrow a = \sin(23) \cdot 40 = 15.63$

$\frac{b}{\sin(52)} = 40 \Rightarrow b = \sin(52) \cdot 40 = 31.52$

$\frac{c}{\sin(105)} = 40 \Rightarrow \sin(105) \cdot 40 = 38.64$

(9) $A=60^\circ$ $B=50^\circ$ $s=40$ $C=70^\circ$ $a=26.94$ $b=23.83$ $c=29.23$

$R = \frac{40}{\sin(60)+\sin(50)+\sin(70)} = 15.554$ (15.5535)

$\frac{a}{\sin(60)} = 2 \cdot 15.554 \Rightarrow a = \sin(60) \cdot 31.108 = 26.94$

$b = \sin(50) \cdot 31.108 = 23.83$

$c = \sin(70) \cdot 31.108 = 29.23$

(10) $A=71^\circ$ $B=88^\circ$ $s=2$ $C=21^\circ$ $a=1.64$ $b=1.74$ $c=0.62$

$R = \frac{2}{\sin(71)+\sin(88)+\sin(21)} = 0.868$ $2 \cdot R = 1.736$ 0.868327

$a = \sin(71) \cdot 1.736 = 1.64$

$b = \sin(88) \cdot 1.736 = 1.74$

$c = \sin(21) \cdot 1.736 = 0.62$

Æfing 3.4 D/S 4

(13) Reikna ummál þríhyrningsins ABC

$A=57°$ $B=72°$ $R=32$ $C=51°$

Reikna hliðar

$a=\sin(57)\cdot 64=53.68$ (53.6749)

$b=\sin(72)\cdot 64=60.87$

$c=\sin(51)\cdot 64=49.73$

ummál $=53.68+60.87+49.73$

ummál $=164.28$

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(15) $A=45°$ $B=80°$ $C=55°$ $R=2$ $2\cdot R=4$

$a=\sin(45)\cdot 4=2.83$

$b=\sin(80)\cdot 4=3.94$

$c=\sin(55)\cdot 4=3.27$

10.04 er ummálið

AFNg 4.1 LVS 1

Formeln

$$\det(a,b) = \begin{vmatrix} a_1 & b_1 \\ a_2 & b_2 \end{vmatrix} = a_1 b_2 - a_2 b_1$$

$$|(ABC)| = \frac{1}{2} \left| \det(\overrightarrow{AB}, \overrightarrow{AC}) \right|$$

① $a = \begin{pmatrix} 2 \\ 3 \end{pmatrix}$ $b = \begin{pmatrix} 1 \\ 5 \end{pmatrix}$

$\det(a,b) = 2 \cdot 5 - 3 \cdot 1 = 7$

② $a = \begin{pmatrix} -2 \\ -4 \end{pmatrix}$ $b = \begin{pmatrix} 2 \\ 6 \end{pmatrix}$

$\det(a,b) = -2 \cdot 6 - (-4) \cdot 2 = -4$

③ $a = \begin{pmatrix} -7 \\ -4 \end{pmatrix}$ $b = \begin{pmatrix} -1 \\ -5 \end{pmatrix}$ $\Rightarrow \det(a,b) = -2 \cdot (-5) - (-4) \cdot (-1) = 6$

10

④ $a = \begin{pmatrix} 7 \\ -4 \end{pmatrix}$ $b = \begin{pmatrix} 4 \\ -3 \end{pmatrix}$ $= \det(a,b) = 7 \cdot (-3) - (-4) \cdot 4 = -5$

⑤ $a = \begin{pmatrix} -12 \\ 15 \end{pmatrix}$ $b = \begin{pmatrix} 4 \\ -5 \end{pmatrix}$ $= \det(a,b) = -12 \cdot (-5) - 15 \cdot 4 = 0$

Aufg 4.1 Bis 2

⑥ A=1,1 B=2,7 C=6,5

$\overrightarrow{AB}=\begin{pmatrix}2-1\\7-1\end{pmatrix}=\begin{pmatrix}1\\6\end{pmatrix}$ $\overrightarrow{AC}=\begin{pmatrix}6-1\\5-1\end{pmatrix}=\begin{pmatrix}5\\4\end{pmatrix}$ $\det(\overrightarrow{AB},\overrightarrow{AC})=\begin{vmatrix}1&5\\6&4\end{vmatrix}$

$\det(a,b)=1\cdot4-6\cdot5=-26=\frac{1}{2}\cdot26=$ (13)

⑦ a=-3,1 b=1,4 c=5,2

$\overrightarrow{AB}=\begin{pmatrix}1-(-3)\\4-\frac{1}{2}\end{pmatrix}=\begin{pmatrix}4\\3\end{pmatrix}$ $\overrightarrow{AC}=\begin{pmatrix}5-(-3)\\2-1\end{pmatrix}=\begin{pmatrix}8\\1\end{pmatrix}$ $\det(\overrightarrow{AB},\overrightarrow{AC})\begin{vmatrix}4&8\\3&1\end{vmatrix}$

$4\cdot1-3\cdot8=20\cdot\frac{1}{2}=$ (10)

⑧ a=2,5 b=5,1 c=4,2

$\overrightarrow{AB}\begin{pmatrix}5-2\\1-5\end{pmatrix}=\begin{pmatrix}3\\-4\end{pmatrix}$ $\overrightarrow{AC}=\begin{matrix}-4-2=\begin{pmatrix}-6\\-3\end{pmatrix}\\2-5\end{matrix}$ $\det(\overrightarrow{AB},\overrightarrow{AC})\begin{vmatrix}3&-6\\-4&-3\end{vmatrix}$

$3\cdot(-3)-(-4)\cdot(-6)=-33\cdot\frac{1}{2}=$ (16.5)

⑨ a=4,0 b=0,3 c=6,4

$\overrightarrow{AB}=\begin{pmatrix}0-4\\3-0\end{pmatrix}=\begin{pmatrix}-4\\3\end{pmatrix}$ $\overrightarrow{AC}=\begin{pmatrix}6-4\\4-6\end{pmatrix}=\begin{pmatrix}2\\4\end{pmatrix}=\det(\overrightarrow{AB},\overrightarrow{AC})=\begin{vmatrix}-4&2\\3&4\end{vmatrix}$

$-4\cdot4-3\cdot2=-22=22\cdot\frac{1}{2}=$ (11)

⑩ a=-1,-5 b=-5,4 c=6,6

$\overrightarrow{AB}=\begin{pmatrix}-5-(-1)\\4-(-5)\end{pmatrix}=\begin{pmatrix}4\\9\end{pmatrix}$ $\overrightarrow{AC}=\begin{pmatrix}6-(-1)\\6-(-5)\end{pmatrix}=\begin{pmatrix}7\\11\end{pmatrix}=\det(\overrightarrow{AB},\overrightarrow{AC})=\begin{vmatrix}4&7\\9&11\end{vmatrix}$

$(ABC)=4\cdot11-9\cdot7=-19=19=\frac{1}{2}\cdot19=(ABC)=$ (9.5)

Aufg 4.2 BLS 1

I: $[x+2y=10]$ II: $[2x-2y=8]$ $a=\begin{pmatrix}1\\2\end{pmatrix}$ $b=\begin{pmatrix}2\\-2\end{pmatrix}$ $c=\begin{pmatrix}10\\8\end{pmatrix}$

x

$$x=\frac{10\cdot 2-8\cdot 2}{1\cdot 2-2\cdot 2}=\frac{4}{2}=2$$

$$y=\frac{1\cdot 8-2\cdot 10}{1\cdot 2-2\cdot 2}=\frac{-12}{-2}=6$$

$$\frac{\begin{vmatrix} c_1 & b_1 \\ c_2 & b_2 \end{vmatrix}}{\begin{vmatrix} a_1 & b_1 \\ a_2 & b_2 \end{vmatrix}}$$

$$\frac{\begin{vmatrix} a_1 & c_1 \\ a_2 & c_2 \end{vmatrix}}{\begin{vmatrix} a_1 & b_1 \\ a_2 & b_2 \end{vmatrix}}$$