



Kaflapróf 2_A

Kafli 4 og 5

STÆF2RH05
Haustönn 2023

Nafn: Lausn

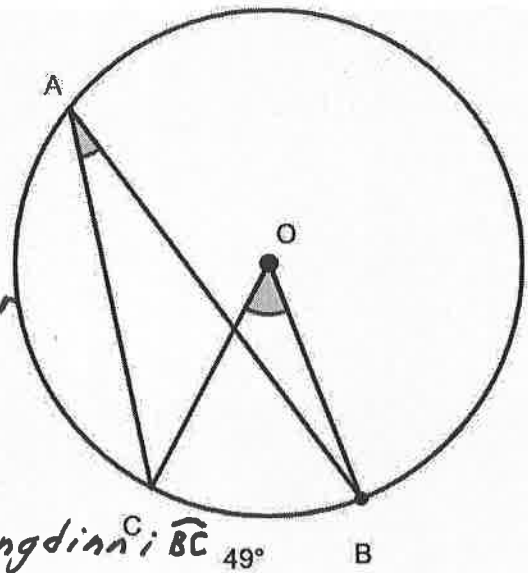
Einkunn:

Sýndu alla útreikninga og formúlur.

1. (12%) Boginn BC er 49° . Reiknaðu út stærð ~~stærð~~ hornanna A og O. Miðpunktur hringsins er O.

Hornið A $24,5^\circ$

Hornið O 49°



- ① Hornið A er ferilhörn sem spannar bogann $\widehat{BC} = 49^\circ$ og er helmingi minna

$$A = \frac{\widehat{BC}}{2} = \frac{49^\circ}{2} = \underline{\underline{24,5^\circ}}$$

- ② Miðhornið O er jafnstórt bogalengdinni \widehat{BC} 49° sem armar þess spanna.

$$\underline{\underline{O = \widehat{BC} = 49^\circ}}$$

2. (18%) Reiknaðu út stærð horni x, boga a og boga AC.

- ① A er ferilhörn sem spannar bogann \widehat{BC} og er helmingurinn af því

$$x = A = \frac{\widehat{BC}}{2} = \frac{95^\circ}{2} = \underline{\underline{47,5^\circ}}$$

- ② Reglan um horn utan við hring:

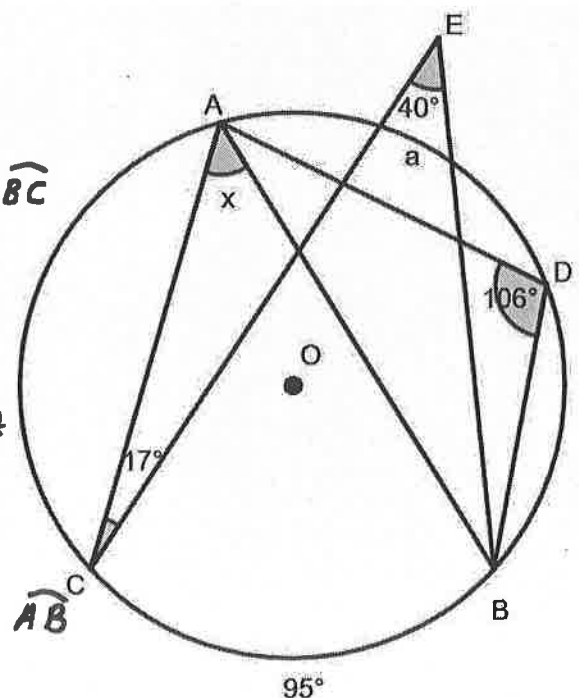
$$A = \frac{y-x}{2} \rightarrow E = \frac{\widehat{BC} - a}{2} \rightarrow 40^\circ = \frac{(95 - a)}{2}$$

$$80^\circ = 95^\circ - a \rightarrow a = 95^\circ - 80^\circ = \underline{\underline{15^\circ}}$$

- ③ Ferilhornið D (105°) spannar bogann \widehat{AB} sem er tvöfalt stærri

$$\widehat{AB} = 2 \cdot D = 2 \cdot 105^\circ = \underline{\underline{210^\circ}}$$

- ④ $\widehat{AC} = \widehat{AB} - \widehat{BC} = 210^\circ - 95^\circ = \underline{\underline{113^\circ}}$



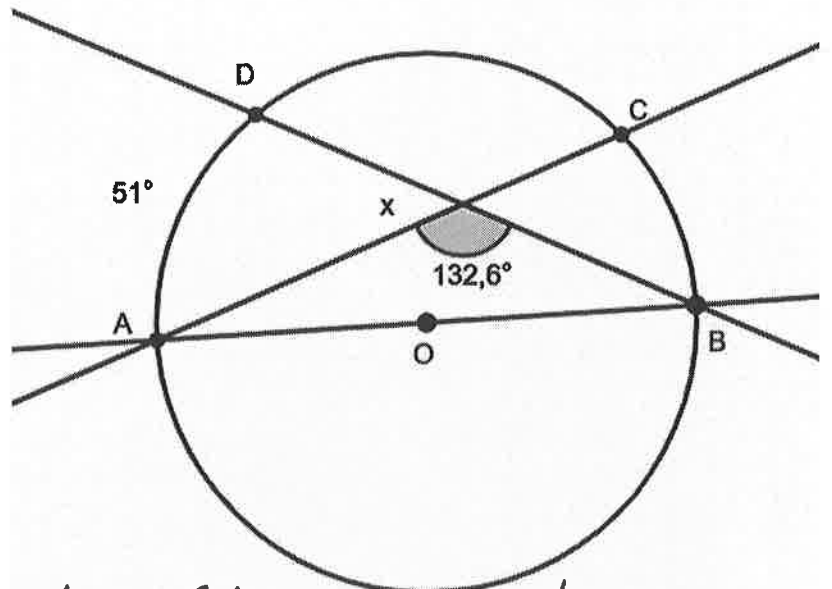
3. (18%) Boginn AD er 51° . Innanvert horn er $132,6^\circ$.

Finndu stærð hornsins x , bogans BC og CD.

Hornið x $47,4^\circ$

Boginn BC $43,8^\circ$

Boginn CD $85,2^\circ$



① Finnum x :

$$x + 132,6^\circ = 180^\circ \quad \text{grannhorn á beinni línu með hornasummu } 180^\circ$$

$$- 132,6^\circ \quad - 132,6^\circ$$

$$\underline{x = 47,4^\circ}$$

② Finnum \widehat{BC} : með topphornareglunni $\angle V = \frac{AB + CD}{2} \rightarrow x = \frac{AD + BC}{2}$

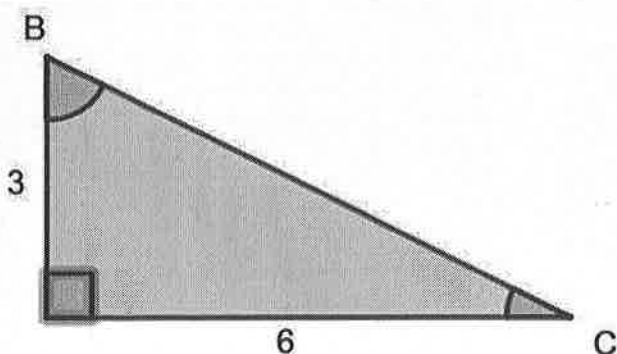
$$2 \cdot 47,4^\circ = \frac{(51^\circ + \widehat{BC}) \cdot 2}{2}$$

$$94,8^\circ = 51^\circ + \widehat{BC} \rightarrow \widehat{BC} = 94,8^\circ - 51^\circ = \underline{43,8^\circ}$$

③ Boginn \widehat{AB} spannar hálfhring með hornasummuna 180°

④ $\widehat{CD} = 180^\circ - \widehat{AD} - \widehat{BC} = 180^\circ - 51^\circ - 43,8^\circ = \underline{85,2^\circ}$

4. (9%) Finndu stærð hornsins B á rétthyrnda þríhyrningnum.



$$\tan(B) = \frac{\text{mótlæg skammhlíð}}{\text{adlög skammhlíð}}$$

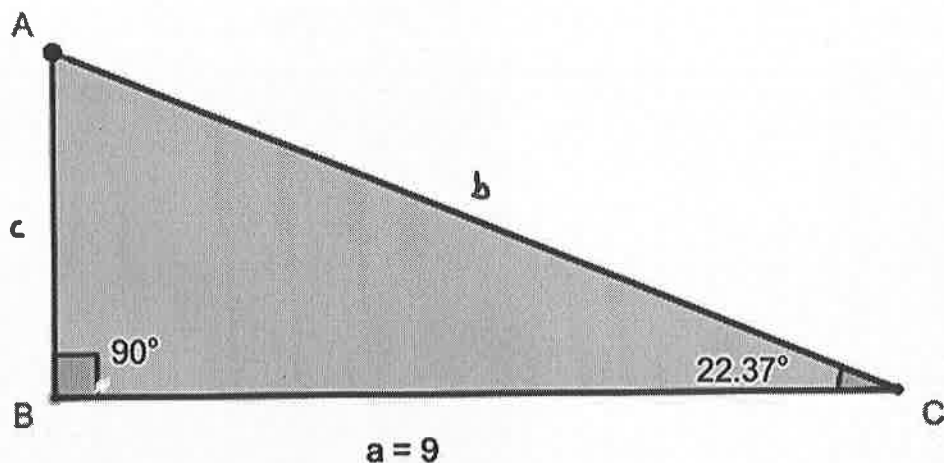
$$\tan(B) = \frac{6}{3} = 2$$

$$B = \tan^{-1}(2) = 63,434 \approx \underline{63,4^\circ}$$

5. (16%) Hliðin a er 9 og hornið C er $22,37^\circ$. Reiknaðu út lengd hliðar b og hliðar c.

Hlið b 9,7

Hlið c 3,7



① Finnum b:

$$\cos(C) = \frac{\text{adlæg skammhlíð}}{\text{langhlíð}} = \frac{a}{b}$$

$$b \cdot \cos(22,37^\circ) = \frac{9 \cdot b}{b}$$

$$b \cdot \cos(22,37^\circ) = 9 \rightarrow \frac{b \cdot \cos(22,37^\circ)}{\cos(22,37^\circ)} = \frac{9}{\cos(22,37^\circ)}$$

$$b = \frac{9}{\cos(22,37^\circ)} = 9,7324 \approx \underline{\underline{9,7}}$$

② Finnum hlið c:

$$\tan(C) = \frac{\text{möttæg skammhlíð}}{\text{adlægri skammhlíð}} = \frac{c}{a}$$

$$9 \cdot \tan(22,37^\circ) = \frac{c \cdot 9}{9}$$

$$9 \cdot \tan(22,37^\circ) = c \leftrightarrow$$

$$c = 9 \cdot \tan(22,37^\circ) = 3,7040 \approx \underline{\underline{3,7}}$$

6. (24%) Þríhyrningurinn ABC er ekki rétthyrndur.

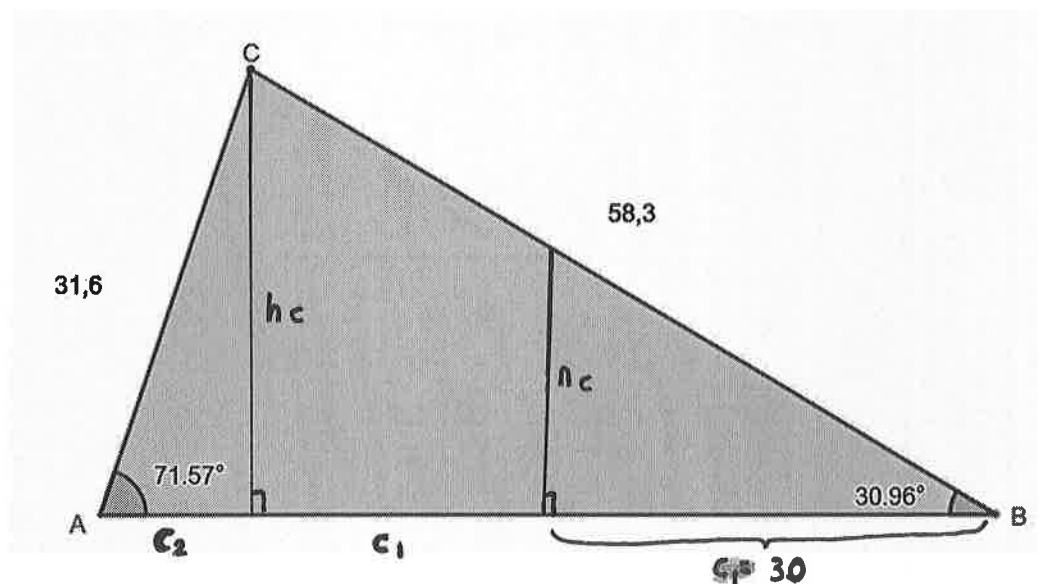
Hornið A = $71,57^\circ$, hornið B = $30,96^\circ$, hliðin a = 58,3 og hliðin b = 31,6.

Reiknaðu

a) (7%) hæð h_c

b) (10%) hliðina c

c) (7%) miðþveril n_c .



$h_c = \underline{30,0}$ (29,98)

Hliðin c = 60 (59,98)

Hliðin $n_c = \underline{18,0}$ (17,997)

① Finnum h_c :

$\sin(A) = \frac{\text{mótlæg skamnhlið}}{\text{langhlið}}$

$\sin(71,57^\circ) = \frac{h_c}{31,6} \rightarrow$

$h_c = 31,6 \cdot \sin(71,57^\circ) = 29,9792 \approx \underline{\underline{30}}$

② Finnum c_1 :

$\cos(B) = \frac{c_1}{a} \rightarrow \cos(30,96^\circ) = \frac{c_1}{58,3} \rightarrow$

$c_1 = 58,3 \cdot \cos(30,96^\circ) = 49,9938 \approx \underline{\underline{49,99}}$

③ Finnum c_2 :

$\cos(A) = \frac{c_2}{b} = \frac{c_2}{31,6} \rightarrow c_2 = 31,6 \cdot \cos(71,57^\circ) \approx \underline{\underline{9,99}}$

④ Finnum c: $c = c_1 + c_2 = 49,99 + 9,99 = \underline{\underline{59,98}} \approx \underline{\underline{60,0}}$

⑤ Finnum n_c : n_c skiptir hlið c í 2 jafnstóra hluta $60/2 = 30$ og er hornrétt á þann punkt (miðpunkt)

$\tan(B) = \frac{n_c}{30} \rightarrow \tan(30,96^\circ) = \frac{n_c}{30} \rightarrow n_c = 30 \cdot \tan(30,96^\circ) \approx \underline{\underline{18,0}}$