

SOLUCIONS DELS EXERCICIS

Pàgina 3

1 $\sin \alpha = \frac{3}{5}$, $\cos \alpha = \frac{4}{5}$, $\operatorname{tg} \alpha = \frac{3}{4}$

2 a) $b = 6 \text{ cm}$ $c = 12\sqrt{2} \text{ cm}$

b) $\sin \beta = \frac{2\sqrt{2}}{3}$, $\cos \beta = \frac{1}{3}$, $\operatorname{tg} \beta = 2\sqrt{2}$

3 $c = 6 \text{ cm}$, $a = \sqrt{261} \text{ cm}$

4

$\sin \alpha$	$\cos \alpha$	$\operatorname{tg} \alpha$
$2/3$	$\sqrt{5}/3$	$2/\sqrt{5}$
$1/2$	$\sqrt{3}/2$	$1/\sqrt{3}$
$\sqrt{5}/\sqrt{6}$	$1/\sqrt{6}$	$\sqrt{5}$

Pàgina 4

5 $\sin 45^\circ = \frac{\sqrt{2}}{2}$, $\cos 45^\circ = \frac{\sqrt{2}}{2}$, $\operatorname{tg} 45^\circ = 1$

6 $\sin 60^\circ = \frac{\sqrt{3}}{2}$, $\cos 60^\circ = \frac{1}{2}$, $\operatorname{tg} 60^\circ = \sqrt{3}$

7 $\sin 30^\circ = \frac{1}{2}$, $\cos 30^\circ = \frac{\sqrt{3}}{2}$, $\operatorname{tg} 30^\circ = \frac{\sqrt{3}}{3}$

8 a) 60° b) 45° c) 30°
d) 30° e) 45° f) 45°

Pàgina 5

9 $35^\circ 41' 7''$ i $54^\circ 18' 53''$

10 $\sin \alpha = \frac{1}{\sqrt{5}}$, $\cos \alpha = \frac{2}{\sqrt{5}}$, $\operatorname{tg} \alpha = \frac{1}{2}$

11 No; $\left(\frac{2}{5}\right)^2 + \left(\frac{3}{5}\right)^2 \neq 1$

12 Sí; $\cos \alpha = \frac{4\sqrt{3}}{7}$; $\alpha = 8^\circ 12' 48''$

13 $b = 18 \sin 58^\circ \approx 15,3 \text{ cm}$
 $c = 18 \cos 58^\circ \approx 9,5 \text{ cm}$
 $\text{Àrea} \approx 72,7 \text{ cm}^2$

Pàgina 6

1 $\cos \alpha = -\frac{\sqrt{3}}{2}$; $\operatorname{tg} \alpha = -\frac{\sqrt{3}}{3}$

2 a) $\sin \alpha \approx -0,85$, $\operatorname{tg} \alpha \approx -1,64$

b) $\cos \alpha \approx -0,92$, $\operatorname{tg} \alpha \approx -0,44$

c) $\sin \alpha \approx 0,86$, $\cos \alpha \approx 0,51$

d) $\sin \alpha \approx -0,93$, $\cos \alpha \approx -0,37$

e) $\sin \alpha \approx 0,71$, $\operatorname{tg} \alpha \approx -1,02$

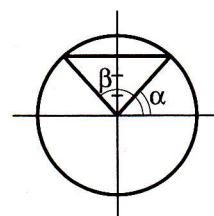
f) $\cos \alpha \approx -0,94$, $\operatorname{tg} \alpha \approx 0,37$

3

α	0°	90°	180°	270°	360°
$\sin \alpha$	0	1	0	-1	0
$\cos \alpha$	1	0	-1	0	1
$\operatorname{tg} \alpha$	0	No existeix	0	No existeix	0

Pàgina 7

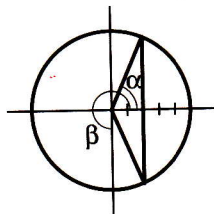
4 a)



$\cos \alpha \approx 0,66$, $\operatorname{tg} \alpha \approx 1,13$

$\cos \beta \approx -0,66$, $\operatorname{tg} \beta \approx -1,13$

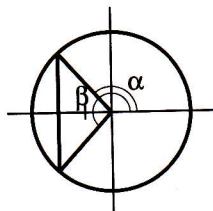
4 b)



$$\sin \alpha \approx 0,92, \quad \operatorname{tg} \alpha \approx 2,29$$

$$\sin \beta \approx -0,92, \quad \operatorname{tg} \beta \approx -2,29$$

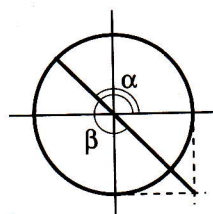
c)



$$\sin \alpha \approx 0,75, \quad \operatorname{tg} \alpha \approx -1,12$$

$$\sin \beta \approx -0,75, \quad \operatorname{tg} \beta \approx 1,12$$

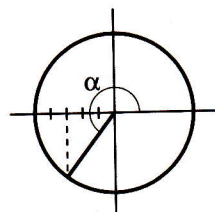
d)



$$\sin \alpha = \frac{\sqrt{2}}{2}, \quad \cos \alpha = -\frac{\sqrt{2}}{2}$$

$$\sin \beta = -\frac{\sqrt{2}}{2}, \quad \cos \beta = -\frac{\sqrt{2}}{2}$$

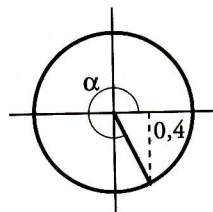
5 a)



$$\cos \alpha = -0,8$$

$$\operatorname{tg} \alpha = 0,75$$

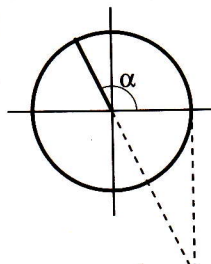
b)



$$\sin \alpha \approx -0,92$$

$$\operatorname{tg} \alpha \approx -2,29$$

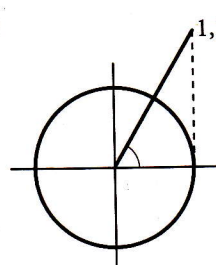
c)



$$\sin \alpha \approx 0,89$$

$$\cos \alpha \approx -0,45$$

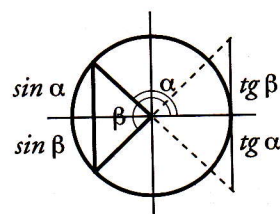
d)



$$\sin \alpha \approx 0,83$$

$$\cos \alpha \approx 0,55$$

6



$$\sin \alpha \approx 0,66, \quad \operatorname{tg} \alpha \approx -0,88$$

$$\sin \beta \approx -0,66, \quad \operatorname{tg} \beta \approx 0,88$$

Pàgina 8

1

α	120°	135°	150°	210°	225°	240°	300°	315°	330°
$\sin \alpha$	$\sqrt{3}/2$	$\sqrt{2}/2$	$1/2$	$-1/2$	$-\sqrt{2}/2$	$-\sqrt{3}/2$	$-\sqrt{3}/2$	$-\sqrt{2}/2$	$-1/2$
$\cos \alpha$	$-1/2$	$-\sqrt{2}/2$	$-\sqrt{3}/2$	$-\sqrt{3}/2$	$-\sqrt{2}/2$	$-1/2$	$1/2$	$\sqrt{2}/2$	$\sqrt{3}/2$
$\operatorname{tg} \alpha$	$-\sqrt{3}$	-1	$-\sqrt{3}/3$	$\sqrt{3}/3$	1	$\sqrt{3}$	$-\sqrt{3}$	-1	$-\sqrt{3}/3$

Pàgina 9

2

$$\sin 118^\circ = \sin 62^\circ \approx 0,88$$

$$\cos 118^\circ = -\cos 62^\circ \approx -0,47$$

$$\operatorname{tg} 118^\circ = -\operatorname{tg} 62^\circ \approx -1,88$$

$$\sin 216^\circ = -\sin 36^\circ \approx -0,59$$

$$\cos 216^\circ = -\cos 36^\circ \approx -0,81$$

$$\operatorname{tg} 216^\circ = \operatorname{tg} 36^\circ \approx 0,73$$

$$\sin 305^\circ = -\sin 55^\circ \approx -0,82$$

$$\cos 305^\circ = \cos 55^\circ \approx 0,57$$

$$\operatorname{tg} 305^\circ = -\operatorname{tg} 55^\circ \approx -1,43$$

- 3 a) 40° b) 50° c) 78°
 d) $65^\circ 30'$ e) 40° f) $74^\circ 15'$

- 4 b) $\sin 116^\circ = \sin 64^\circ$
 c) $\operatorname{tg} 200^\circ = \operatorname{tg} 20^\circ$
 d) $\sin 290^\circ = -\sin 70^\circ$
 e) $\cos 260^\circ = -\cos 80^\circ$
 f) $\operatorname{tg} 160^\circ = -\operatorname{tg} 20^\circ$
 g) $\sin 325^\circ = -\sin 35^\circ$
 h) $\operatorname{tg} 305^\circ = -\operatorname{tg} 55^\circ$

- 5 a) $\sin \alpha = \frac{\sqrt{5}}{3}$
 b) $\operatorname{tg} \alpha = \frac{\sqrt{5}}{2}$
 c) $\sin (180 + \alpha) = -\frac{\sqrt{5}}{3}$
 d) $\cos (180 - \alpha) = -\frac{2}{3}$
 e) $\operatorname{tg} (180 + \alpha) = \frac{\sqrt{5}}{2}$
 f) $\sin (180 - \alpha) = \frac{\sqrt{5}}{3}$
 g) $\cos (360 - \alpha) = \frac{2}{3}$
 h) $\operatorname{tg} (360 - \alpha) = -\frac{\sqrt{5}}{2}$

- 6 a) $\alpha_1 = 32^\circ$ b) $\alpha_1 = 21^\circ$ c) $\alpha_1 = 50^\circ$
 $\alpha_2 = 148^\circ$ $\alpha_2 = 159^\circ$ $\alpha_2 = 130^\circ$
 $\alpha_3 = 212^\circ$ $\alpha_3 = 201^\circ$ $\alpha_3 = 230^\circ$
 $\alpha_4 = 328^\circ$ $\alpha_4 = 339^\circ$ $\alpha_4 = 310^\circ$

Pàgina 11

- 7 a) $\sin \alpha = \frac{\sqrt{21}}{5}$
 b) $\operatorname{tg} \alpha = \frac{\sqrt{21}}{2}$
 c) $\sin (90^\circ - \alpha) = \frac{2}{5}$
 d) $\cos (90^\circ - \alpha) = -\frac{\sqrt{21}}{5}$

$$e) \operatorname{tg} (90^\circ - \alpha) = \frac{2}{\sqrt{21}}$$

$$f) \cos (90^\circ - \alpha) = \frac{\sqrt{21}}{5}$$

$$g) \operatorname{tg} (90^\circ + \alpha) = -\frac{2}{\sqrt{21}}$$

$$h) \sin (90^\circ + \alpha) = \frac{2}{5}$$

8 a) $\sin 42^\circ = \cos 48^\circ \approx 0,67$

$$\cos 42^\circ = \sin 48^\circ \approx 0,74$$

$$\operatorname{tg} 42^\circ = 1/\operatorname{tg} 48^\circ \approx 0,9$$

b) $\sin 138^\circ = \cos 48^\circ \approx 0,67$

$$\cos 138^\circ = -\sin 48^\circ \approx -0,74$$

$$\operatorname{tg} 138^\circ = -1/\operatorname{tg} 48^\circ \approx -0,9$$

c) $\sin 132^\circ = \sin 48^\circ \approx 0,74$

$$\cos 132^\circ = -\cos 48^\circ \approx -0,67$$

$$\operatorname{tg} 132^\circ = -\operatorname{tg} 48^\circ \approx -1,11$$

d) $\sin 228^\circ = -\sin 48^\circ \approx -0,74$

$$\cos 228^\circ = -\cos 48^\circ \approx -0,67$$

$$\operatorname{tg} 228^\circ = \operatorname{tg} 48^\circ \approx 1,11$$

e) $\sin 312^\circ = -\sin 48^\circ \approx -0,74$

$$\cos 312^\circ = \cos 48^\circ \approx 0,67$$

$$\operatorname{tg} 312^\circ = -\operatorname{tg} 48^\circ \approx -1,11$$

9 $\begin{cases} \sin 50^\circ = \cos 40^\circ \approx 0,77 \\ \cos 50^\circ = \sin 40^\circ \approx 0,64 \\ \operatorname{tg} 50^\circ = 1/\operatorname{tg} 40^\circ \approx 1,19 \end{cases}$

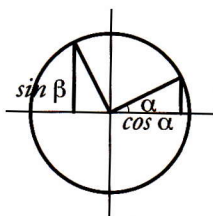
$$\begin{cases} \sin 130^\circ = \cos 40^\circ \approx 0,77 \\ \cos 130^\circ = -\sin 40^\circ \approx -0,64 \\ \operatorname{tg} 130^\circ = -\frac{1}{\operatorname{tg} 40^\circ} \approx -1,19 \end{cases}$$

$$\begin{cases} \sin 140^\circ = \sin 40^\circ \approx 0,64 \\ \cos 140^\circ = -\cos 40^\circ \approx -0,77 \\ \operatorname{tg} 140^\circ = -\operatorname{tg} 40^\circ \approx -0,84 \end{cases}$$

$$\begin{cases} \sin 220^\circ = -\sin 40^\circ \approx -0,64 \\ \cos 220^\circ = -\cos 40^\circ \approx -0,77 \\ \operatorname{tg} 220^\circ = \operatorname{tg} 40^\circ \approx 0,84 \end{cases}$$

$$\begin{cases} \sin 320^\circ = -\sin 40^\circ \approx -0,64 \\ \cos 320^\circ = \cos 40^\circ \approx 0,77 \\ \operatorname{tg} 320^\circ = -\operatorname{tg} 40^\circ \approx -0,84 \end{cases}$$

10



$$\begin{aligned} \text{1) a) } & \begin{cases} \alpha_1 = 62^\circ \\ \alpha_2 = 118^\circ \\ \alpha_3 = 242^\circ \\ \alpha_4 = 298^\circ \end{cases} & \text{b) } & \begin{cases} \alpha_1 = 33^\circ \\ \alpha_2 = 123^\circ \\ \alpha_3 = 237^\circ \\ \alpha_4 = 303^\circ \end{cases} & \text{c) } & \begin{cases} \alpha_1 = 20^\circ \\ \alpha_2 = 110^\circ \\ \alpha_3 = 200^\circ \\ \alpha_4 = 290^\circ \end{cases} \end{aligned}$$

3 a) $42^\circ 58' 19''$

b) $68^\circ 45' 18''$

c) $137^\circ 30' 36''$

d) $14^\circ 19' 26''$

e) 72°

f) 135°

g) 420°

h) 540°

4 $1,6 \text{ rad} = 91^\circ 40' 24''$

Pàgina 12

$$\begin{aligned} \text{1) a) } & \cos 800^\circ = \cos 80^\circ \\ & \text{b) } \operatorname{tg} 2040^\circ = \operatorname{tg} 240^\circ = \operatorname{tg} 60^\circ \\ & \text{c) } \operatorname{tg} 1935^\circ = -\operatorname{tg} 45^\circ \\ & \text{d) } \sin(-115^\circ) = \sin 245^\circ = -\sin 65^\circ \\ & \text{e) } \cos(-218^\circ) = \cos 142^\circ = -\cos 38^\circ \\ & \text{f) } \operatorname{tg}(-250^\circ) = \operatorname{tg} 110^\circ = -\operatorname{tg} 70^\circ \end{aligned}$$

2 $270^\circ + 360^\circ, 270^\circ + 360^\circ \cdot 5, -90^\circ, -90^\circ - 360^\circ$

$$\begin{aligned} \text{3) a) } & \cos 810^\circ = \sin 90^\circ = 1 \\ & \text{b) } \cos 1260^\circ = \cos 180^\circ = -1 \\ & \text{c) } \operatorname{tg} 1800^\circ = \operatorname{tg} 0^\circ = 0 \\ & \text{d) } \cos(-180^\circ) = \cos 180^\circ = -1 \\ & \text{e) } \sin(-90^\circ) = -\sin 90^\circ = -1 \\ & \text{f) } \operatorname{tg} 405^\circ = \operatorname{tg} 45^\circ = 1 \end{aligned}$$

Pàgina 13

$$\begin{aligned} \text{1) a) } & 1,4 \text{ rad} & \text{b) } & 3,49 \text{ rad} \\ & \text{c) } 5,58 \text{ rad} & \text{d) } & 13,6 \text{ rad} \end{aligned}$$

$$\begin{aligned} \text{2) a) } & \frac{2\pi}{3} & \text{b) } & \frac{5\pi}{6} & \text{c) } & \frac{3\pi}{4} & \text{d) } & \frac{7\pi}{6} \\ & \text{e) } & \frac{\pi}{5} & \text{f) } & \frac{8\pi}{9} & \text{g) } & \frac{3\pi}{2} & \text{h) } & \frac{7\pi}{12} \end{aligned}$$

Pàgina 14

$$\begin{aligned} \text{1) a) } & \alpha_1 = 39^\circ 47' 31'' \\ & \alpha_2 = 140^\circ 12' 29'' \\ & \text{b) } \alpha_1 = 56^\circ 18' 36'' \\ & \alpha_2 = 236^\circ 18' 36'' \\ & \text{c) } \alpha_1 = 68^\circ 53' 59'' \\ & \alpha_2 = 291^\circ 6' 1'' \end{aligned}$$

$$\begin{aligned} \text{2) } & \sin \alpha \approx -0,91 & \sin \beta &= 0,98 \\ & \cos \alpha \approx -0,41 & \cos \beta &\approx -0,18 \\ & \operatorname{tg} \alpha \approx 2,19 & \operatorname{tg} \beta &= -5,52 \end{aligned}$$

$$\begin{aligned} \text{3) a) } & 134^\circ 25' 37'' \\ & \text{b) } 124^\circ 54' 55'' \\ & \text{c) } 305^\circ 27' 2'' \\ & \text{d) } 240^\circ 15' 18'' \\ & \text{e) } 206^\circ 44' 37'' \\ & \text{f) } 116^\circ 33' 54'' \end{aligned}$$

Pàgina 15

4 Les raons trigonomètriques coincideixen, en valor absolut, amb les de 50° :

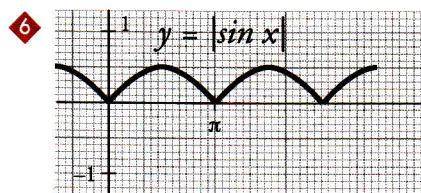
$$-50^\circ = 360^\circ - 50^\circ; \quad 130^\circ = 180^\circ - 50^\circ;$$

$$310^\circ = 360^\circ - 50^\circ; \quad 230^\circ = 180^\circ + 50^\circ;$$

$$410^\circ = 50^\circ + 360^\circ$$

5 Perquè difereixen en π rad: $\frac{6\pi}{5} = \pi + \frac{\pi}{5}$

- 6 a) $\alpha_1 = 0,75 \text{ rad}$
 $\alpha_2 = 2,39 \text{ rad}$
 b) $\alpha_1 = 0,72 \text{ rad}$
 $\alpha_2 = 5,56 \text{ rad}$
 c) $\alpha_1 = 1,16 \text{ rad}$
 $\alpha_2 = 4,3 \text{ rad}$



Pàgina 18

- 7 a) 128° b) 50° c) -20° d) 45°

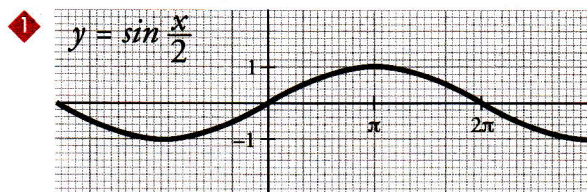
1 $c \approx 13,7 \text{ m}$ $\widehat{B} = 36^\circ 1' 55''$ $\widehat{C} = 53^\circ 58' 5''$
 $\widehat{A} = 90^\circ$

2 $a = 10 \text{ m}$ $\widehat{B} = 53^\circ 7' 48''$, $\widehat{C} = 36^\circ 52' 12''$

3 $h = 6,9 \text{ cm}$ Àrea $\approx 65,5 \text{ cm}^2$

4 $l \approx 3,46 \text{ m}$

Pàgina 16



Pàgina 19

5 $\alpha = 67^\circ 22' 48''$ $\beta = 112^\circ 37' 12''$

6 Àrea $\approx 137,9 \text{ cm}^2$

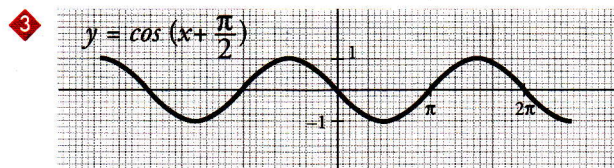
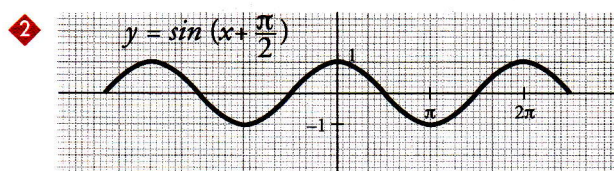
7 $A'B' \approx 13 \text{ cm}$

8 $\widehat{AOB} = 41^\circ 50' 59''$

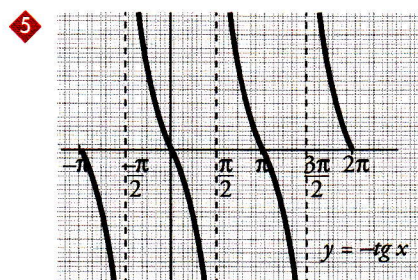
9 $h \approx 1,44 \text{ m}$

10 $l = \sqrt{29} \text{ cm}$ $P \approx 30,8 \text{ cm}$ $\alpha = 68^\circ 11' 55''$
 $\beta = 111^\circ 48' 5''$

Pàgina 17



4 $y = -\sin x = \cos\left(x + \frac{\pi}{2}\right)$



Pàgina 20

11 a) $7,5 \text{ cm}$ b) $12,99 \text{ cm}$

c) $\text{tg } \widehat{R} = \frac{12,99}{14,5} \rightarrow \widehat{R} = 41^\circ 51' 21''$

12 $BB' \approx 13,25 \text{ cm}$ $B'C \approx 21,2 \text{ cm}$,

$B'A \approx 3,2 \text{ cm} \rightarrow AB \approx 13,6 \text{ cm}$

Àrea $= 119,25 \text{ cm}^2$

13 $\alpha = 45^\circ 14' 23''$

Pàgina 21

14 $d \approx 55,14 \text{ m}$, $h \approx 46,27 \text{ m}$

15 $\overline{QR} \approx 21,4 \text{ m}$

16 $\overline{SR} \approx 3,9 \text{ m}$

2 $l \approx 12,24 \text{ cm}$; $A \approx 723,7 \text{ cm}^2$

3 $h \approx 49,2 \text{ m}$

4 $h \approx 46,5 \text{ m}$

5 $x \approx 261 \text{ m}$

6 Àrea $\approx 55\,934,9 \text{ m}^2$

Pàgina 23

1 $\overline{AB} \approx 123,4 \text{ m}$ $\overline{AC} \approx 96,8 \text{ m}$

2 $a \approx 33,42 \text{ m}$ $b \approx 39,50 \text{ m}$

3 $\overline{BC} \approx 13,5 \text{ cm}$

$\overline{AB} \approx 23,4 \text{ cm}$

$p \approx 54,9 \text{ cm}$

Àrea $\approx 120,8 \text{ cm}^2$

4 $\overline{AB} \approx 36,1 \text{ m}$

5 $b \approx 51,4 \text{ cm}$ $a \approx 47,3$ $\widehat{C} = 15^\circ$

Pàgina 27

7 $l_1 \approx 52,6 \text{ cm}$ $l_2 \approx 48,9 \text{ cm}$ $l_3 \approx 63,6 \text{ cm}$
 $p \approx 165 \text{ cm}$

8 a) $b \approx 90,6 \text{ m}$, $c \approx 40,8 \text{ m}$, $\widehat{C} = 26^\circ 27' 38''$

b) $\widehat{B} = 23^\circ 8' 33''$, $\widehat{C} = 32^\circ 17' 27''$, $c \approx 171,3 \text{ cm}$

c) $\widehat{A} = 72^\circ 16' 42''$, $\widehat{B} = 48^\circ 12' 5''$, $\widehat{C} = 59^\circ 31' 74''$

d) $\widehat{A} = 73^\circ 49' 27''$, $\widehat{C} = 40^\circ 57' 39''$, $c \approx 14,5 \text{ m}$

9 Dos ($\widehat{B}_1 = 40^\circ 55' 25''$, $c_1 \approx 163,8 \text{ m}$;
 $\widehat{B}_2 = 139^\circ 4' 35''$, $c_2 \approx 39,1 \text{ m}$)

10 No; $\sin \widehat{A} > 1$. Impossible.

Pàgina 25

1 $\widehat{A} = 47^\circ 16' 4''$, $\widehat{B} = 27^\circ 19' 41''$, $\widehat{C} = 105^\circ 24' 15''$

2 a) $c \approx 84,3 \text{ cm}$, $\widehat{B} = 89^\circ 6' 3''$, $\widehat{A} = 40^\circ 53' 57''$

b) $a \approx 17,8 \text{ cm}$, $\widehat{B} = 49^\circ 31' 57''$, $\widehat{C} = 25^\circ 28' 3''$

c) $a \approx 43,9 \text{ cm}$, $\widehat{B} = 31^\circ 24' 28''$, $\widehat{A} = 83^\circ 35' 32''$

d) $\widehat{A} \approx 49^\circ 28' 49''$, $\widehat{B} = 92^\circ 26' 4''$, $\widehat{C} = 38^\circ 5' 7''$

3 $\overline{BC} \approx 1,9 \text{ km}$ $\overline{AC} \approx 1,5 \text{ km}$

4 $\overline{AB} \approx 302 \text{ m}$

11 Dues solucions:

$$\begin{cases} \widehat{A}_1 = 43^\circ 42' 9'' , \widehat{C}_1 = 103^\circ 30' 57'' , c_1 \approx 87,8 \text{ m} \\ \widehat{A}_2 = 136^\circ 17' 51'' , \widehat{C}_1 = 10^\circ 55' 15'' , c_2 \approx 17,11 \text{ m} \end{cases}$$

12 Àrea $= 8 + 8\sqrt{7} \text{ m}^2$

Pàgina 28

13 $R \approx 43,86 \text{ N}$

14 $R \approx 150 \text{ N}$ $\alpha = 126^\circ 52' 12''$ amb la més petita.

15 $a \approx 31,8 \text{ cm}$
 $b \approx 56,1 \text{ cm}$

Pàgina 26

1 $p \approx 53,9 \text{ cm}$ Àrea $\approx 90,2 \text{ cm}^2$

$$16 \quad HB \approx 64,2 \text{ m} \quad AH \approx 29,9 \text{ m}$$

$$17 \quad AB \approx 444,47$$

Pàgina 29

$$18 \quad BB' \approx 68 \text{ m}$$

$$19 \quad T' \approx 3,87 \text{ cm}$$

$$20 \quad \hat{D} = 54^\circ 29' 34'' \quad \hat{C} = 102^\circ 47' 14'' \\ \hat{A} = 82^\circ 43' 12''$$

$$21 \quad \alpha_1 = 60^\circ 15' 52'' \quad \alpha_2 = 119^\circ 44' 8'' \\ \alpha_3 = 75^\circ 44' 8'' \quad \alpha_4 = 104^\circ 15' 52'' \quad l = 5,6 \text{ cm}$$

Pàgina 30

$$1 \quad \sin 75^\circ = \frac{\sqrt{2} + \sqrt{6}}{4}; \quad \cos 75^\circ = \frac{\sqrt{6} - \sqrt{2}}{4}; \\ \operatorname{tg} 75^\circ = \frac{\sqrt{3} + 3}{3 - \sqrt{3}}$$

$$2 \quad \sin 90^\circ = 1; \quad \cos 90^\circ = 0; \quad \operatorname{tg} 90^\circ: \text{no existeix}$$

Pàgina 31

$$3 \quad \sin 60^\circ = \frac{\sqrt{3}}{2}; \quad \cos 60^\circ = \frac{1}{2}; \quad \operatorname{tg} 60^\circ = \sqrt{3}$$

$$\sin 15^\circ = \sqrt{\frac{2 - \sqrt{3}}{4}}; \quad \cos 15^\circ = \sqrt{\frac{2 + \sqrt{3}}{4}};$$

$$\operatorname{tg} 15^\circ = \sqrt{\frac{2 - \sqrt{3}}{2 + \sqrt{3}}}$$

Pàgina 32

$$4 \quad \operatorname{tg} 25^\circ$$

$$5 \quad \frac{2 \sin 65^\circ \cos 15^\circ}{-2 \sin 65^\circ \sin 15^\circ} = -\frac{1}{\operatorname{tg} 15^\circ}$$

$$6 \quad 1/3$$

$$7 \quad \sin(\alpha + \beta) = \frac{3}{5} + \frac{3\sqrt{7}}{20}$$

$$\cos(\alpha + \beta) = \frac{\sqrt{7}}{5} - \frac{9}{20}$$

$$\operatorname{tg}(\alpha + \beta) = \frac{12 + 3\sqrt{7}}{4\sqrt{7} - 9}$$

$$\sin(\alpha - \beta) = \frac{3}{5} - \frac{3\sqrt{7}}{20}$$

$$\cos(\alpha - \beta) = \frac{\sqrt{7}}{5} + \frac{9}{20}$$

$$\operatorname{tg}(\alpha - \beta) = \frac{12 - 3\sqrt{7}}{4\sqrt{7} + 9}$$

$$\sin 2\alpha = \frac{3\sqrt{7}}{8}, \quad \cos 2\alpha = -\frac{1}{8}, \quad \operatorname{tg} 2\alpha = -3\sqrt{7}$$

$$\sin \frac{\beta}{2} = \frac{1}{\sqrt{10}}, \quad \cos \frac{\beta}{2} = \frac{3}{\sqrt{10}}, \quad \operatorname{tg} \frac{\beta}{2} = \frac{1}{3}$$

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$$8 \quad \text{a) } \sin 2\alpha = -\frac{4\sqrt{21}}{25} \quad \text{b) } \operatorname{tg} \frac{\alpha}{2} = \sqrt{\frac{7}{3}}$$

$$\text{c) } \sin\left(\alpha + \frac{\pi}{4}\right) = \frac{\sqrt{42} - 2\sqrt{2}}{10}$$

$$\text{d) } \cos\left(\alpha - \frac{\pi}{6}\right) = \frac{-2\sqrt{3} + \sqrt{21}}{10}$$

$$9 \quad \text{a) } \sin \frac{\alpha}{2} = \sqrt{\frac{41 + 4\sqrt{41}}{82}} \approx 0,9$$

$$\text{b) } \cos 2\alpha = \frac{-9}{41} \quad \text{c) } \operatorname{tg}\left(\alpha - \frac{\pi}{4}\right) = \frac{1}{9}$$

$$\text{d) } \sin\left(\alpha + \frac{\pi}{3}\right) = \frac{-5\sqrt{41} - 4\sqrt{123}}{82} \approx -0,93$$

$$10 \quad \frac{\sin 3\alpha}{\sin \alpha}$$