SOH CAH TOA

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LISTA 8

1-)

$X^2 = 16 + 4$

$X^2 = 20$

$X = \sqrt{20}$

$X = 2\sqrt{5}$

a-) $sen\ \hat{D} = \frac{4}{2\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{4\sqrt{5}}{10} = \frac{2\sqrt{5}}{5}$

b-) $\cos \hat{D} = \frac{2}{2\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{2\sqrt{5}}{2.5} = \frac{2\sqrt{5}}{10} = \frac{\sqrt{5}}{5}$

C-) $tg\ \hat{D} = \frac{4}{2} = 2$

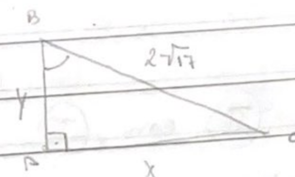
D-) $cotg\ \hat{D}$

E-) $sen\ \hat{E} = \frac{2}{2\sqrt{5}} = \frac{2}{2\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{2\sqrt{5}}{10} = \frac{\sqrt{5}}{5}$

f-) $\cos \hat{E} = \frac{a}{2\sqrt{5}} = \frac{4}{2\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{4\sqrt{5}}{10} = \frac{2\sqrt{5}}{5}$

G-) $tg\ \hat{E} = \frac{2}{4} = \frac{1}{2}$

h-) $cotg\ \hat{E} =$



2-)

$\cos \hat{B} = \frac{2\sqrt{51}}{17} = \frac{Y}{2\sqrt{17}}$

$2\sqrt{51} \cdot 2\sqrt{17} = 17Y$

$2.2\sqrt{51.17} = 17Y$

$4\sqrt{17.17.3} = 17Y$

$4\sqrt{17^2.3} = 17Y$

$\frac{4.\cancel{17}\sqrt{3}}{\cancel{17}} = Y$

$Y = 4\sqrt{3}$

$(2\sqrt{17})^2 = (4\sqrt{3})^2 + X^2$

$4.17 = 16.3 + X^2$

$68 = 48 + X^2$

$68 - 48 = X^2$

$20 = X^2$

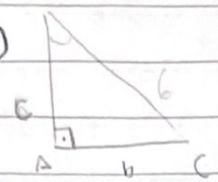
$\sqrt{20} = X$

$X = 2\sqrt{5}$

20	2
10	2
5	5
1	

/B/

3-)



$tg\ \hat{B} = \frac{\sqrt{5}}{2} = \frac{b}{c}$

$c \cdot \sqrt{5} = b \cdot 2$

$\frac{c \cdot \sqrt{5}}{2} = b$

Pitagora

$36 = \left(\frac{c \cdot \sqrt{5}}{2}\right)^2 + c^2$

$36 = \left(\frac{c^2 \cdot 5}{4}\right) + c^2$

$36 = \frac{5c^2 + 4c^2}{4}$

$36 = \frac{9c^2}{4}$

$36 \cdot 4 = 9c^2$

$144 = 9c^2$

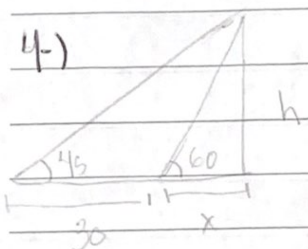
$\frac{144}{9} = c^2$

$c = \sqrt{\frac{144}{9}} = \frac{12}{3}$

$b = \frac{c}{1} \cdot \frac{\sqrt{5}}{2} = \frac{12}{3} \cdot \frac{\sqrt{5}}{2}$

$b = \frac{12\sqrt{5}}{6} = 2\sqrt{5}$

4-)



I $tg(45) = \frac{1}{1} = \frac{h}{30+x} = h = 30 + x$

II $tg(60) \Rightarrow \sqrt{3} = \frac{h}{x}$

$\Rightarrow x\sqrt{3} = h$

$\Rightarrow x = \frac{h}{\sqrt{3}}$

substitua II em I

$h = 30 + \frac{h}{\sqrt{3}}$

$h - \frac{h}{\sqrt{3}} = 30$

$\frac{\sqrt{3} \cdot h - h}{\sqrt{3}} = 30$

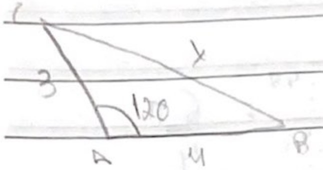
$h\sqrt{3} - h = 30 \cdot \sqrt{3}$

$h(\sqrt{3} - 1) = 30 \cdot \sqrt{3}$

$h = \frac{30\sqrt{3}}{\sqrt{3} - 1}$

5-)

a-) use a lei dos cosenos pois você conhece dois lado e o ângulo entre eles



$x^2 = 3^2 + 4^2 + 2 \cdot 3 \cdot 4 \cdot \cos 120°$

$x^2 = 25 - 24 \cdot \cos 60$

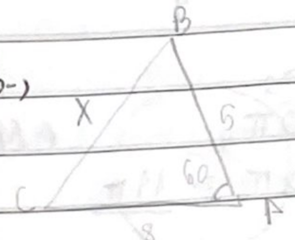
$x^2 = 25 - 24 \cdot -\frac{1}{2}$

$x^2 = 25 + 12$

$x = \sqrt{37}$

$180 - 120 = 60$

b-)



$x^2 = 5^2 + 8^2 - 2 \cdot 8 \cdot 5 \cdot \cos 60$

$x^2 = 25 + (64) - 80 \cdot \frac{1}{2}$

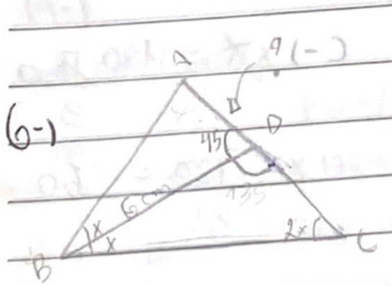
$x^2 = 89 - 40$

$x^2 = 49$

$x = \sqrt{49}$

$x = 7$

6-)



$\boxed{\Delta ABD}$ com $x = 15$, então $\hat{A} = 120°$

aplicando a lei dos senos ΔABD

$\frac{\operatorname{sen} 45}{\overline{AB}} = \frac{\operatorname{sen} 120}{6}$

$\Rightarrow \frac{\frac{\sqrt{2}}{2}}{\overline{AB}} = \frac{\frac{\sqrt{3}}{2}}{6} \Rightarrow \overline{AB} \cdot \frac{\sqrt{3}}{2} = 6 \cdot \frac{\sqrt{2}}{2}$

$\Rightarrow \overline{AB} = \frac{6\sqrt{2}}{\sqrt{3}} \Rightarrow \overline{AB} = \frac{6\sqrt{6}}{3}$

$\overline{AB} = 2\sqrt{6}$ //

$\boxed{\Delta BDC}$

$x + 2x + 135 = 180°$

$3x = 45$

$x = \frac{45}{3} = 15$

/ /

7-) a-) $210° \rightarrow x$

$180° \rightarrow \pi$

$210\pi = 180x$

$x = \frac{210\pi}{180} = \frac{7\pi}{6}$

b-) $180x = 240\pi$

$= \frac{240\pi}{180} \, {}^{:60}_{:60} \quad \frac{4\pi}{3}$

c-) $180x = 270\pi$

$x = \frac{270\pi}{180} \, {}^{:45}_{:45} = \frac{6\pi}{4}$

d-) $180x = 300\pi$

$x = \frac{300\pi}{180} = \frac{5\pi}{3}$

E-) $180y = 315\pi$

$= \frac{315\pi}{180} = \frac{7\pi}{4}$

f-) $180x = 315\pi$

$= \frac{315\pi}{180} = \frac{7\pi}{4}$

G-) $180x = 330\pi$

$x = \frac{330\pi}{180} = \frac{11\pi}{6}$

8-)

a-) π — 180

$\frac{\pi}{6}$ — x

$x\cancel{\pi} = 180 . \frac{\cancel{\pi}}{6}$

$x = \frac{180}{6} = 30$

b-) $x\cancel{\pi} = 180 . \frac{\cancel{\pi}}{4}$

$x = \frac{180}{4} = 45$

c-) $x\cancel{\pi} = 180 \frac{\cancel{\pi}}{3}$

$x = \frac{180}{3} = 60$

d-) $x\cancel{\pi} = \frac{180 . 2\cancel{\pi}}{3}$

$x = \frac{360}{3}$

$x = 120$

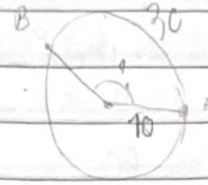
E-) $x\cancel{\pi} = 180 . \frac{3\cancel{\pi}}{4}$

$x = \frac{540}{4} = 135$

f-) $x\cancel{\pi} = 180 . \frac{5\cancel{\pi}}{6}$

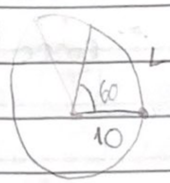
$x = \frac{900}{6} = 150$

Paula Branca

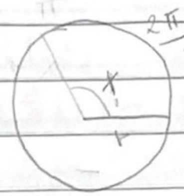
9-) 

$\boxed{\hat{\alpha} = \frac{L}{r}} = \frac{30}{10} = 3\,rad$

usar a formula quando precisar achar um destes caras

10-) 

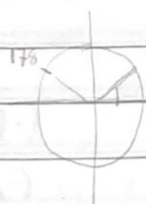
$\frac{1\pi}{3} = \frac{L}{10} = \frac{10\pi}{3} = L \Rightarrow L = 10,47$

11-) 

$= x = \frac{\frac{2\pi r}{3}}{r} = x = \frac{2\pi}{3}$

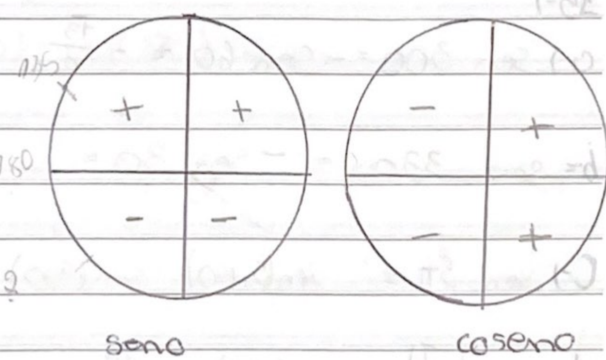
14-)

a-) cos 178



$180 - 178 = 2$

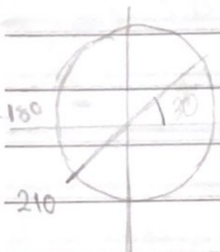
$\cos 178 = -\cos 2$



b-) $\cot g\left(\frac{7\pi}{6}\right) = 210$

$Sen\ 210 = -sen\ 210$

$\cos 210 = -\cos 210$



$\cot g\left(\frac{7\pi}{6}\right) = \frac{\cos\left(\frac{7\pi}{6}\right)}{sen\left(\frac{7\pi}{6}\right)} = \frac{-\cos\left(\frac{\pi}{6}\right)}{-sen\left(\frac{\pi}{6}\right)}$

$= \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \frac{\sqrt{3}}{2} \cdot \frac{2}{1} = \frac{2\sqrt{3}}{2} = \sqrt{3}$

$\cot g = \frac{\cos x}{sen\ x}$

c-) $sen\left(\frac{7\pi}{6}\right) = -sen\left(\frac{\pi}{6}\right)$

d-) $sen\left(\frac{5\pi}{4}\right) = -sen\left(\frac{\pi}{4}\right)$

E-) $sen\ 251 = -sen\ (71)$

I-) $tg\ 290$

K-)

f-) $sec\ 124 = \frac{1}{cos\ 124} = -\frac{1}{cos\ 56}$

G-) $cos\left(\frac{5\pi}{3}\right) = cos\ 60$

h-) $cos\left(\frac{7\pi}{6}\right) = -cos\ \frac{\pi}{6}$

J-) $cossec\ \frac{11\pi}{6} = cosec\left(\frac{\pi}{6}\right)$

L-)

15-)

a-) $sen\ 300 = -sen\ 60 = -\frac{\sqrt{3}}{2}$

b= $sen\ 330 = -sen\ 30 =$

C-) $sen\ 5\pi = sen(5.180) = sen(900) = sen(180) = 0$

d-) $sen\left(-\frac{\pi}{4}\right) = sen(-45) = -\frac{\sqrt{2}}{2}$

E-) $\frac{sen\frac{\pi}{2} - sen\frac{\pi}{3}}{sen\frac{\pi}{6}} = \frac{sen(90) - sen(60)}{sen(30)} = \frac{1 - \frac{\sqrt{3}}{2}}{\frac{1}{2}} =$

$\frac{2-\sqrt{3}}{2} \cdot \frac{2}{1} = \frac{4-2\sqrt{3}}{2} = 2-\sqrt{3}$

Pauta Branca

f-) $\frac{sen(45) \cdot sen(2\ldots}{(sen(150))^2}$

$= \frac{-\frac{\sqrt{6}}{4}}{+\frac{1}{4}} = -\frac{\sqrt{6}}{4}$

16-)

a-) $cos\left(\frac{5\pi}{3}\right) = cos$

b-) $cos\left(\frac{7\pi}{6}\right) = cos$

c-) $cos\left(\frac{7\pi}{4}\right) = cos$

d-) $cos(720) = co$

E-) $cos(120) = -c$

F-) $cos\left(\frac{\pi}{2}\right) = cos$

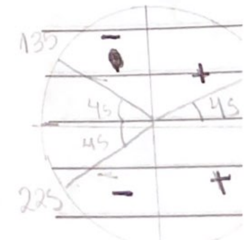
G-) $cos(150) = -$

H-) $cos\left(\frac{\pi}{2} + \pi\right) =$

i-)

17-)

A-) $cos\ x = -$



Anti horario

$X = 135 + 2k$

$225 + 2$

f-) $\dfrac{sen(45) \cdot sen(240)}{(sen(150))^2} = \dfrac{\frac{\sqrt{2}}{2} \cdot -sen\,60}{(-sen\,30)^2} = \dfrac{\frac{\sqrt{2}}{2} \cdot -\frac{\sqrt{3}}{2}}{+\frac{1}{4}}$

$= \dfrac{-\frac{\sqrt{6}}{4}}{+\frac{1}{4}} = -\dfrac{\sqrt{6}}{4} \cdot \dfrac{4}{1} = -\dfrac{4\sqrt{6}}{4} = -\sqrt{6}$

16-)

a-) $\cos\left(\frac{5\pi}{3}\right) = \cos(300) = \cos(60) = \frac{1}{2}$

b-) $\cos\left(\frac{7\pi}{6}\right) = \cos(210) = -\cos(30) = -\frac{\sqrt{3}}{2}$

c-) $\cos\left(\frac{7\pi}{4}\right) = \cos(315) = \cos(45) = \frac{\sqrt{2}}{2}$

d-) $\cos(720) = \cos(0) = 1$

E-) $\cos(120) = -\cos(60) = -\frac{1}{2}$

F-) $\cos\left(\frac{\pi}{2}\right) = \cos(90) = 0$

G-) $\cos(150) = -\cos(30) = -\frac{\sqrt{3}}{2}$

H-) $\cos\left(\frac{\pi}{2} + \pi\right) = \cos(90 + 180) = \cos(270) = 0$

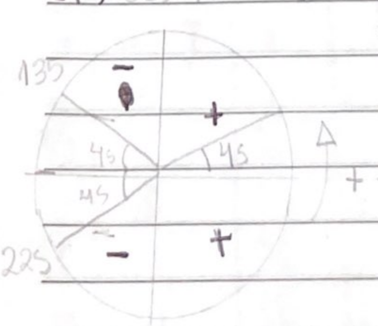
i-) ?

17-)

A-) $\cos x = -\frac{\sqrt{2}}{2}$

$= \cos(135) = -\cos(45) = -\frac{\sqrt{2}}{2}$

$= \cos(225) = -\cos(45) = -\frac{\sqrt{2}}{2}$



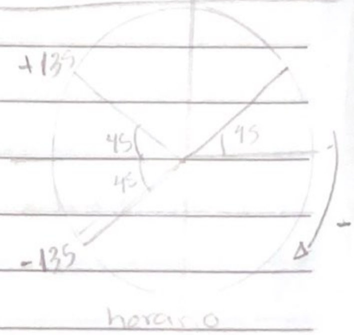
anti horario

$X = 135 + 2K\pi$ ou

$225 + 2K\pi$

Outra resposta

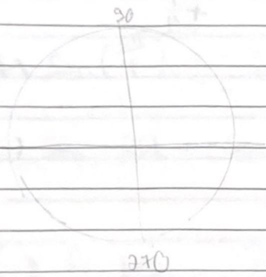
$x = \pm 135 + 2K\pi$



horario

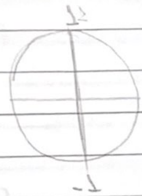
b-) $\cos x = 0$ $\Rightarrow \cos(90) = 0$

$\Rightarrow \cos(270) = 0$



$x = \frac{\pi}{2} + k\pi$

18-) $\operatorname{sen}(x) = 2m - 5$



o X está entre o 1 e -1 no circulo

$-1 \leq 2m - 5 \leq 1$

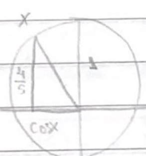
$2m - 5 \geq -1$	$2m - 5 \leq 1$
$2m \geq 4$	$2m \leq 6$
$m \geq 2$	$m \leq 3$

$X = 2 \leq m \leq 3$

19-)

$\operatorname{sen} x = \frac{4}{5}$

$90 < x < 180$



$1^2 = \left(\frac{4}{5}\right)^2 + (\cos x)^2$

$1 = \frac{16}{25} + (\cos x)^2$

$(\cos x)^2 = \frac{1}{1} - \frac{16}{25}$

$(\cos x)^2 = \frac{9}{25}$

$\cos x = \sqrt{\frac{9}{25}}$

$\cos x = \frac{3}{5}$

20-)

$\cos x = \frac{2}{3}$

$0 < x \leq 90$

$\operatorname{sen} x = ?$

$\operatorname{sen}(90 - x) = ?$

$\operatorname{sen}(90 - x)$

$\operatorname{sen}(90 - x) = $ se

22-) a-) $f(x) =$

x	sen(x)	y=
0	0	
$\frac{\pi}{2}$	1	
π	0	
$\frac{3\pi}{2}$	-1	
2π	0	

b-) $f(x) =$ Se

t	sen T
0	0
$\pi/2$	1
π	0
$3\pi/2$	-1
2π	0

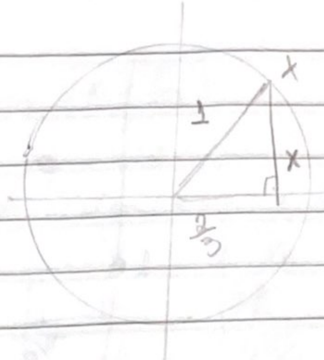
20-)

$\cos x = \frac{2}{3}$

$0 \le x \le 90$

sen $x = ?$

sen $(90 - x) = ?$



$(\text{sen}\,x)^2 + \left(\frac{2}{3}\right)^2 = 1^2$

$(\text{sen}\,x)^2 = 1 - \frac{4}{9}$

$(\text{sen}\,x)^2 = \frac{9-4}{9}$

$(\text{sen}\,x)^2 = \frac{5}{9}$

$\text{sen}\,x = \sqrt{\frac{5}{9}}$

$\text{sen}\,x = \frac{\sqrt{5}}{3}$

$\text{sen}(90 - x)$

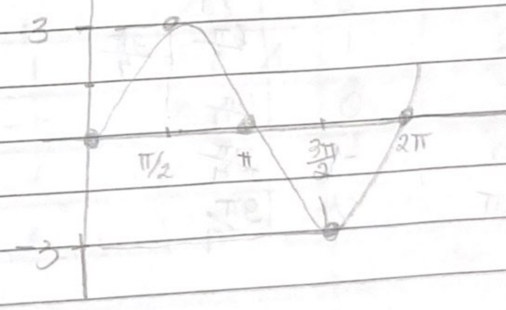
$\text{sen}(90 - x) = \text{sen}(90) \cdot \cos(x) - \cos(90) \cdot \text{sen}(x)$

$= 1 \cdot \cos(x) - 0$

$= \cos x = \frac{2}{3}$ //

22-) a-) $f(x) = 3 \cdot \text{sen}(x)$

x	sen(x)	y = 3.sen(x)
0	0	0
$\frac{\pi}{2}$	1	3
π	0	0
$\frac{3\pi}{2}$	−1	−3
2π	0	0

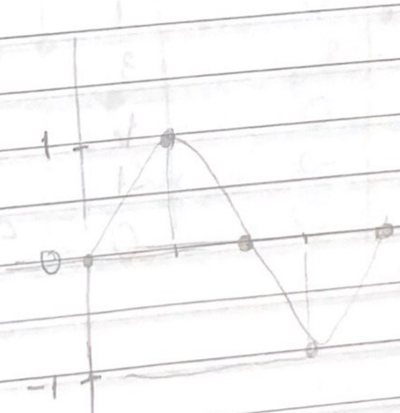


b-) $f(x) = \text{sen}(3x)$

$t = 3x$ $\quad x = \frac{t}{3}$

$t = \frac{\pi}{2} \Rightarrow x = \frac{\pi}{2} \cdot \frac{1}{3} = \frac{\pi}{6}$

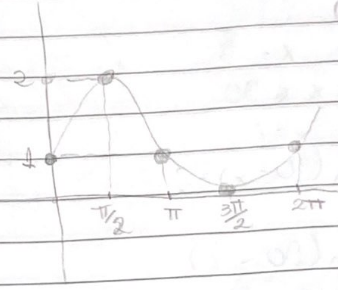
t	sen T	x
0	0	0
$\pi/2$	1	$\pi/6$
π	0	$\pi/3$
$3\pi/2$	−1	$\pi/2$
2π	0	$\frac{2\pi}{3}$



/ /

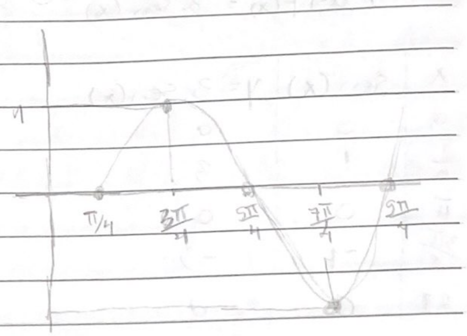
c-) $f(x) = 1 + \text{sen}(x)$

x	sen (x)	$f(x) = 1 + \text{sen}(x)$
0	0	1
$\pi/2$	1	2
π	0	1
$3\pi/2$	-1	0
2π	0	1



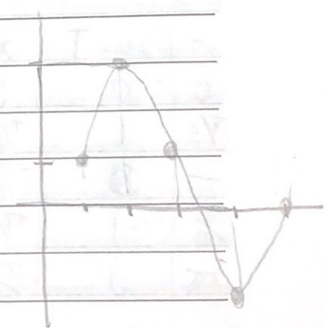
d-) $f(x) = \text{sen}\left(x - \frac{\pi}{4}\right)$ $\quad t = x - \frac{\pi}{4}$ $\quad x = t + \frac{\pi}{4}$

$t = x - \frac{\pi}{4}$	$y = \text{Sen}(t)$	x
0	0	$\pi/4$
$\pi/2$	1	$\frac{6\pi}{8} = \frac{3\pi}{4}$
π	0	$\frac{5\pi}{4}$
$\frac{3\pi}{2}$	-1	$\frac{7\pi}{4}$
2π	0	$\frac{9\pi}{4}$



E-) $f(x) = 1 + 2\,\text{sen}\left(\frac{x}{2} - \frac{\pi}{6}\right)$

$t = \frac{x}{2} - \frac{\pi}{6}$	Sen (t)	2. Sen (t)	1 + 2.sen(t)	X
0	0	0	1	$\frac{\pi}{3}$
$\pi/2$	1	2	3	$\frac{4\pi}{3}$
π	0	0	1	$\frac{7\pi}{3}$
$\frac{3\pi}{2}$	-1	-2	-1	$\frac{10\pi}{3}$
2π	0	0	0	$\frac{13\pi}{3}$



Pauta Branca

f-) $f(x) =$

$t = x - \frac{\pi}{2}$
0
$\pi/2$
π
$\frac{3\pi}{2}$
2π

G-) $f(x) =$

$t = 3x - \frac{\pi}{4}$
0
$\frac{\pi}{2}$
π
$3\pi/2$
2π

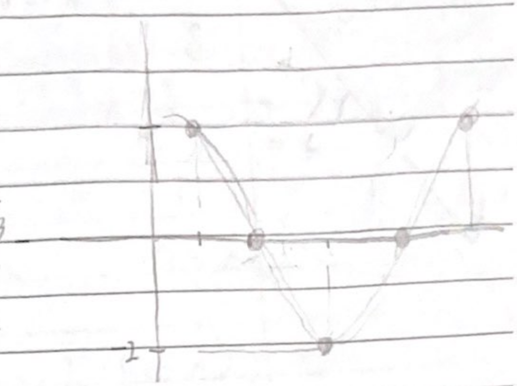
h-) $f(x) =$

X	y = c
0	1
$\frac{\pi}{2}$	0
π	-1
$\frac{3\pi}{2}$	0
2π	1

$x = \frac{\pi}{2} + \frac{\pi}{3}$

f-) $f(x) = 2.\cos\left(x - \frac{\pi}{3}\right)$

$t = x - \frac{\pi}{3}$	$\cos(t)$	$2.\cos(t)$	x
0	1	2	$\pi/3$
$\pi/2$	0	0	$\frac{5\pi}{6}$
π	-1	-2	$4\pi/3$
$\frac{3\pi}{2}$	0	0	$\frac{11\pi}{6}$
2π	1	2	$\frac{7\pi}{3}$

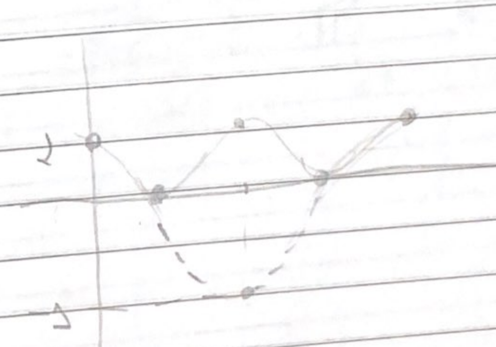


G-) $f(x) = -1 + 2.\cos\left(3x - \frac{\pi}{4}\right)$

$t = 3x - \frac{\pi}{4}$	$\cos(t)$	$2.\cos t$	$-1+2.\cos(t)$	x
0	1	2	1	$\pi/12$
$\frac{\pi}{2}$	0	0	-1	$\pi/4$
π	-1	-2	-3	$\frac{5\pi}{12}$
$3\pi/2$	0	0	-1	$7\pi/4$
2π	1	2	1	$9\pi/4$

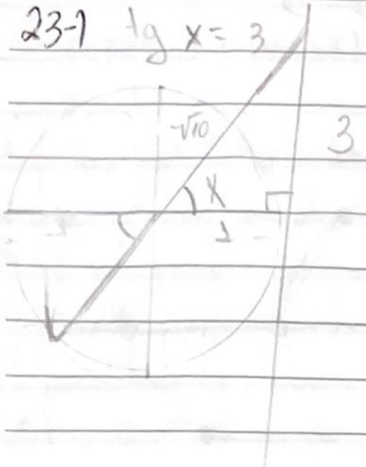
h-) $f(x) = |\cos x|$

x	$y = \cos x$
0	1
$\frac{\pi}{2}$	0
π	-1
$\frac{3\pi}{2}$	0
2π	1



/ /

23-1 $tg\ x = 3$



$h^2 = 9 + 1$

$h = \sqrt{10}$

$$\frac{\sqrt{10}}{sen\ 90} = \frac{3}{sen\ x}$$

$$3 \cdot sen\ 90 = sen\ x \cdot \sqrt{10}$$

$$\frac{3}{\sqrt{10}} = sen\ x$$

$$sen\ x = \frac{3}{\sqrt{10}} \cdot \frac{\sqrt{10}}{\sqrt{10}} = \frac{3\sqrt{10}}{10}$$

Como temos o sen x e queremos o cos x que é o mesmo angulo usamos

$(sen\ x)^2 + (cos\ x)^2 = 1$

$$(cos\ x)^2 = \frac{1}{1} - \frac{90}{100} = \frac{100-90}{100} = \frac{10}{100}$$

$$cos\ x = \sqrt{\frac{1}{10}} = \frac{1}{\sqrt{10}} = \frac{1}{\sqrt{10}} \cdot \frac{\sqrt{10}}{\sqrt{10}} = -\frac{\sqrt{10}}{10}$$

terceiro quadrante é negativo

Como 3° quadrante é negativo no seno então $\Rightarrow sen\ x = -\frac{3\sqrt{10}}{10}$

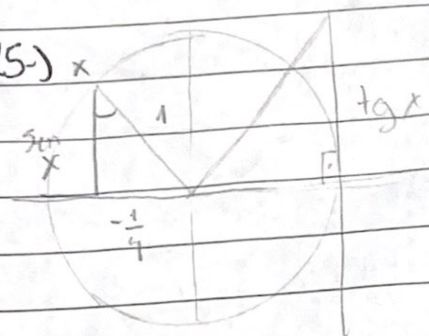
$$cotg\ x = \frac{1}{tg} = \frac{1}{3}$$

24-) $\boxed{\operatorname{cosec} x = \frac{1}{\operatorname{sen} x}}$ $\boxed{\sec x = \frac{1}{\cos x}}$ $\boxed{\operatorname{cotg} = \frac{\cos x}{\operatorname{sen} x}}$

$$y = \frac{\operatorname{cosec} x - \sec x}{\operatorname{cotg} x - 1} \Rightarrow \frac{\frac{1}{\operatorname{sen} x} - \frac{1}{\cos x}}{\frac{\cos x}{\operatorname{sen} x} - \frac{1}{1}} = \frac{\frac{\cos x - \operatorname{sen} x}{\operatorname{sen} x \cdot \cos x}}{\frac{\cos x - \operatorname{sen} x}{\operatorname{sen} x}}$$

$$= \frac{\cancel{\cos x - \operatorname{sen} x}}{\cancel{\operatorname{sen} x} \cdot \cos x} \cdot \frac{\cancel{\operatorname{sen} x}}{\cancel{\cos x - \operatorname{sen} x}} = \frac{1}{\cos x} = -\sec x \,//$$

25-)



$$(\operatorname{sen} x)^2 + (\cos x)^2 = 1$$

$$\operatorname{sen} x = \frac{\sqrt{15}}{4}$$

$$y = \frac{2 \cdot \left(\frac{1}{\cos x}\right) + 3 \cdot \left(\frac{\cos x}{\operatorname{sen} x}\right)}{-\left(\frac{co}{ca}\right) + 2\left(\frac{1}{\operatorname{sen} x}\right)}$$

$$y = \frac{-\frac{8}{1} + 3\left(-\frac{1}{\sqrt{15}}\right)}{-\sqrt{15} + 2\left(\frac{4\sqrt{15}}{15}\right)} \Rightarrow \frac{-8 - \frac{3}{\sqrt{15}}}{\frac{-\sqrt{15}}{1} + \frac{8}{\sqrt{15}}} = \frac{\frac{-8\sqrt{15} - 3}{\sqrt{15}}}{\frac{15 + 8}{\sqrt{15}}}$$

$$= \frac{\frac{-8\sqrt{15} - 3}{\sqrt{15}}}{\frac{23}{\sqrt{15}}} = \frac{-8\sqrt{15} - 3}{\cancel{\sqrt{15}}} \cdot \frac{\cancel{\sqrt{15}}}{23} = \frac{-8\sqrt{15} - 3}{23}$$