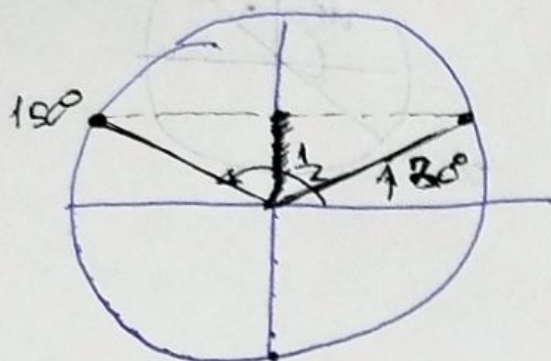


EJEMPLO 2: Resolver las siguientes ecuaciones trigonométricas básicas:

básicas:

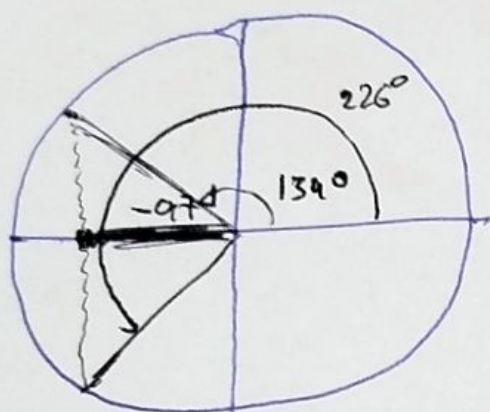
$$a) \sin \alpha = \frac{1}{2} \Rightarrow \alpha = \arcsin \frac{1}{2} = 30^\circ \Rightarrow \begin{cases} \alpha_1 = 30^\circ + K360^\circ \\ \alpha_2 = 150^\circ + K360^\circ \end{cases} \quad K \in \mathbb{Z}$$

$180^\circ - 30^\circ = 150^\circ$



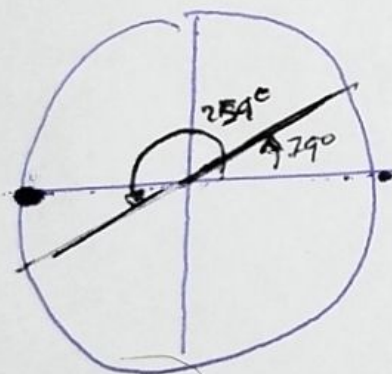
$$b) \cos \alpha = -0.7 \Rightarrow \alpha = \arccos(-0.7) \approx 134^\circ \Rightarrow \begin{cases} \alpha_1 = 134^\circ + K360^\circ \\ \alpha_2 = 226^\circ + K360^\circ \end{cases} \quad K \in \mathbb{Z}$$

$360^\circ - 134^\circ = 226^\circ$



$$c) \tan \alpha = 5 \Rightarrow \alpha = \arctan 5 \approx 79^\circ \Rightarrow \begin{cases} \alpha_1 = 79^\circ + K360^\circ \\ \alpha_2 = 259^\circ + K360^\circ \end{cases} \quad K \in \mathbb{Z}$$

$180^\circ + 79^\circ = 259^\circ$



$$d) \sin(2\alpha + 30^\circ) = \frac{\sqrt{3}}{2} \Rightarrow 2\alpha + 30^\circ = \arcsin \frac{\sqrt{3}}{2} = 60^\circ \Rightarrow \begin{cases} 2\alpha_1 + 30^\circ = 60^\circ + K360^\circ \\ 2\alpha_2 + 30^\circ = 120^\circ + K360^\circ \end{cases}$$

$180^\circ \cdot 60^\circ = 120^\circ$

$$\Rightarrow \begin{cases} 2\alpha_1 = 30^\circ + K360^\circ \\ 2\alpha_2 = 90^\circ + K360^\circ \end{cases} \Rightarrow \begin{cases} \alpha_1 = \frac{30^\circ + K360^\circ}{2} = \frac{30^\circ}{2} + \frac{K360^\circ}{2} = 15^\circ + K180^\circ \\ \alpha_2 = \frac{90^\circ + K360^\circ}{2} = \frac{90^\circ}{2} + \frac{K360^\circ}{2} = 45^\circ + K180^\circ \end{cases}$$

$\begin{matrix} \nearrow 45^\circ \\ \searrow 195^\circ \\ \nearrow 45^\circ \\ \searrow 225^\circ \end{matrix}$

SOLUCIONES

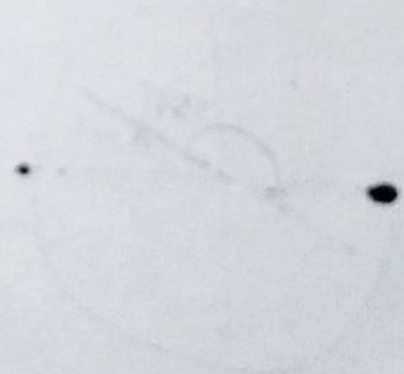
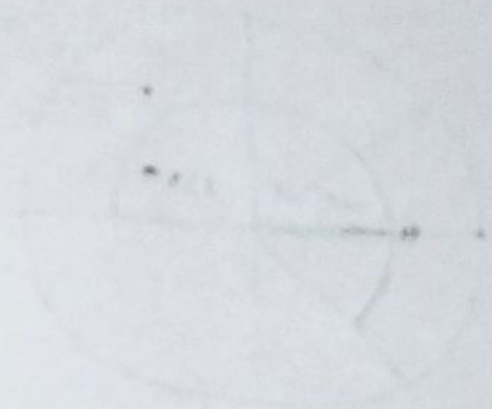
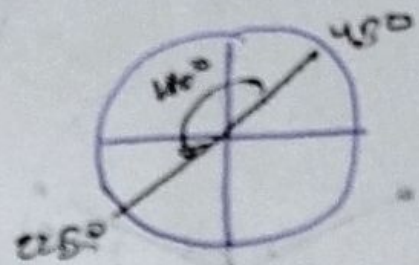
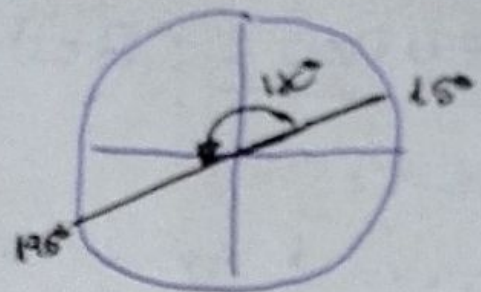
$$\alpha_1 = 15^\circ + K 360^\circ$$

$$\alpha_2 = 45^\circ + K 360^\circ$$

$$\alpha_3 = 135^\circ + K 360^\circ$$

$$\alpha_4 = 225^\circ + K 360^\circ$$

$$K \in \mathbb{Z}$$

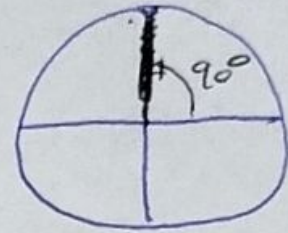


EJEMPLO 203 : Resuelve las siguientes ecuaciones trigonométricas :

a) $\sin(2x) + \sqrt{2} \cos x = 0 \rightarrow (2 \sin x \cos x) + \sqrt{2} \cos x = 0 \rightarrow$
 $\cos x (2 \sin x + \sqrt{2}) = 0 \rightarrow \begin{cases} \cos x = 0 & \textcircled{1} \\ 2 \sin x + \sqrt{2} = 0 \rightarrow 2 \sin x = -\sqrt{2} \rightarrow \sin x = -\frac{\sqrt{2}}{2} & \textcircled{2} \end{cases}$

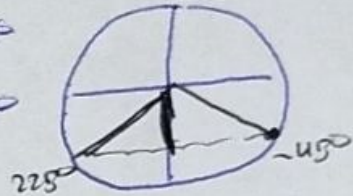
CASO 1

$\cos x = 0 \Rightarrow x = \arccos 0 = 90^\circ \Rightarrow \begin{cases} x_1 = 90^\circ + K360^\circ \\ x_2 = 270^\circ + K360^\circ \end{cases}$
 $360^\circ - 90^\circ = 270^\circ$



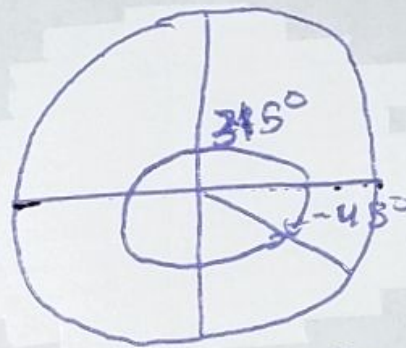
CASO 2

$\sin x = -\frac{\sqrt{2}}{2} \Rightarrow x = \arcsin(-\frac{\sqrt{2}}{2}) = -45^\circ \Rightarrow \begin{cases} x_1 = -45^\circ + K360^\circ \\ x_2 = 225^\circ + K360^\circ \end{cases}$
 $180^\circ - (-45^\circ) = 225^\circ$



SOLUCIONES

$\begin{cases} x_1 = 90^\circ + K360^\circ \\ x_2 = 225^\circ + K360^\circ \\ x_3 = 270^\circ + K360^\circ \\ x_4 = 315^\circ + K360^\circ \end{cases}$

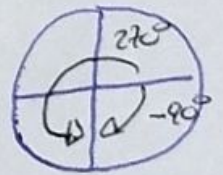


$360^\circ - 45^\circ = 315^\circ$

b) $\cos 2x - \sin x = 0 \rightarrow (\cos^2 x - \sin^2 x) - \sin x = 0 \rightarrow \cos^2 x - \sin^2 x - \sin x = 0$
 $\rightarrow (1 - \sin^2 x) - \sin^2 x - \sin x = 0 \rightarrow -2 \sin^2 x - \sin x + 1 = 0$
 $\sin x = \frac{-(-1) \pm \sqrt{(-1)^2 - 4(-2)(1)}}{2 \cdot (-2)} = \frac{1 \pm \sqrt{9}}{-4} = \frac{1 \pm 3}{-4} \rightarrow \begin{cases} \sin x = \frac{1+3}{-4} = -1 & \textcircled{1} \\ \sin x = \frac{1-3}{-4} = \frac{1}{2} & \textcircled{2} \end{cases}$

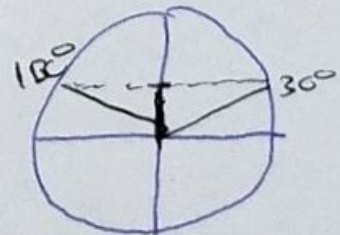
CASO 1

$\sin x = -1 \Rightarrow x = \arcsin(-1) = -90^\circ \Rightarrow \begin{cases} x_1 = -90^\circ + K360^\circ \\ x_2 = 270^\circ + K360^\circ \end{cases}$
 $180^\circ - (-90^\circ) = 270^\circ$



CASO 2

$\sin x = \frac{1}{2} \Rightarrow x = \arcsin \frac{1}{2} = 30^\circ \Rightarrow \begin{cases} x_1 = 30^\circ + K360^\circ \\ x_2 = 150^\circ + K360^\circ \end{cases}$
 $180^\circ - 30^\circ = 150^\circ$



SOLUCIONES

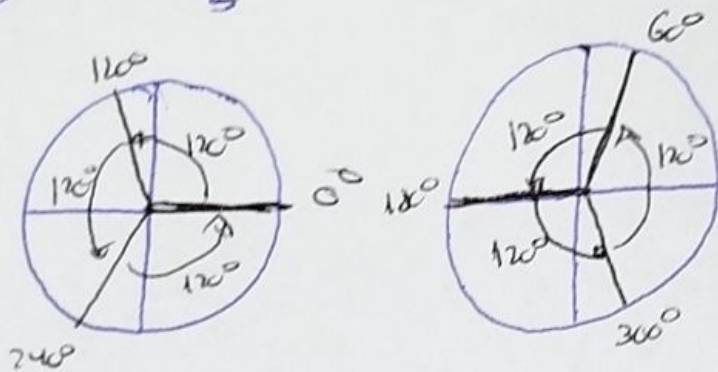
$$\begin{cases} x_1 = 30^\circ + K360^\circ \\ x_2 = 150^\circ + K360^\circ \\ x_3 = 270^\circ + K360^\circ \end{cases}$$

$$\begin{aligned} c) \sin(4x) + \sin(2x) &> 0 \rightarrow 2\sin\left(\frac{4x+2x}{2}\right)\cos\left(\frac{4x-2x}{2}\right) > 0 \rightarrow 2\sin(3x)\cos x > 0 \\ &\rightarrow \sin(3x)\cos x > 0 \begin{cases} \rightarrow \sin(3x) > 0 & ① \\ \rightarrow \cos x > 0 & ② \end{cases} \end{aligned}$$

Caso A

$$\sin(3x) = 0 \rightarrow 3x = \arcsin 0 = 0^\circ \rightarrow \begin{cases} 3x_1 = 0^\circ + K360^\circ \\ 3x_2 = 180^\circ + K360^\circ \end{cases} \rightarrow$$

$$\rightarrow \begin{cases} x_1 = \frac{0^\circ + K360^\circ}{3} = \frac{0^\circ}{3} + \frac{K360^\circ}{3} = 0^\circ + K120^\circ \rightarrow 0^\circ, 120^\circ, 240^\circ \\ x_2 = \frac{180^\circ + K360^\circ}{3} = \frac{180^\circ}{3} + \frac{K360^\circ}{3} = 60^\circ + K120^\circ \rightarrow 60^\circ, 180^\circ, 300^\circ \end{cases}$$



Caso 2

$$\cos x = 0 \rightarrow x = \arccos 0 = 90^\circ \rightarrow \begin{cases} x_1 = 90^\circ + K360^\circ \\ x_2 = 270^\circ + K360^\circ \end{cases}$$

$$360^\circ - 90^\circ = 270^\circ$$

SOLUCIONES

$$\begin{aligned} x_1 &= 0^\circ + K360^\circ \\ x_2 &= 60^\circ + K360^\circ \\ x_3 &= 90^\circ + K360^\circ \\ x_4 &= 120^\circ + K360^\circ \end{aligned}$$

$$\begin{aligned} x_5 &= 180^\circ + K360^\circ \\ x_6 &= 240^\circ + K360^\circ \\ x_7 &= 270^\circ + K360^\circ \\ x_8 &= 300^\circ + K360^\circ \end{aligned}$$