1) $\left| \begin{array}{l} x + 3y = 25 \\ 4x - y = 22 \end{array} \right|$

2) $\left| \begin{array}{l} \frac{1}{3}y + \frac{1}{6}x = \frac{1}{15} \\ \frac{3}{2}x = \frac{3}{5} - 3y \end{array} \right|$

3) $\left| \begin{array}{l} 2x - y + 3z = 7 \\ 4x + 3y - z = -3 \\ -x + 2y - 3z = -8 \end{array} \right|$ Pivot $| \cdot 4$ $+$ $| \cdot 2$ $+$

$\left| \begin{array}{l} -x + 2y - 3z = -8 \\ 0 \quad 11y - 13z = -35 \\ 0 \quad 3y - 3z = -9 \end{array} \right|$ $| \cdot (-\frac{1}{3})$ $\left| \begin{array}{l} -x + 2y - 3z = -8 \\ 0 \quad -y + z = 3 \\ 0 \quad 11y - 13z = -35 \end{array} \right|$ Pivot $| \cdot 11$ $+$

$\left| \begin{array}{l} -x + 2y - 3z = -8 \\ 0 \quad -y + z = 3 \\ 0 \quad 0 - 2z = -2 \end{array} \right|$ $z = 1$

$-x - 4 - 3 = -8$ $\quad x = 1$

$-y + 1 = 3$ $\quad y = -2$

$S(1 \mid -2 \mid 1)$

1) $\begin{vmatrix} x + 3y = 25 \\ 4x - y = 22 \end{vmatrix}$ $\quad x = 25 - 3y$ $\quad x = 25 - 18 = 7$

$4 \cdot (25 - 3y) - y = 100 - 12y - y = 22 \quad | - 100$

$-13y = -78 \quad | : (-13)$

$y = 6$

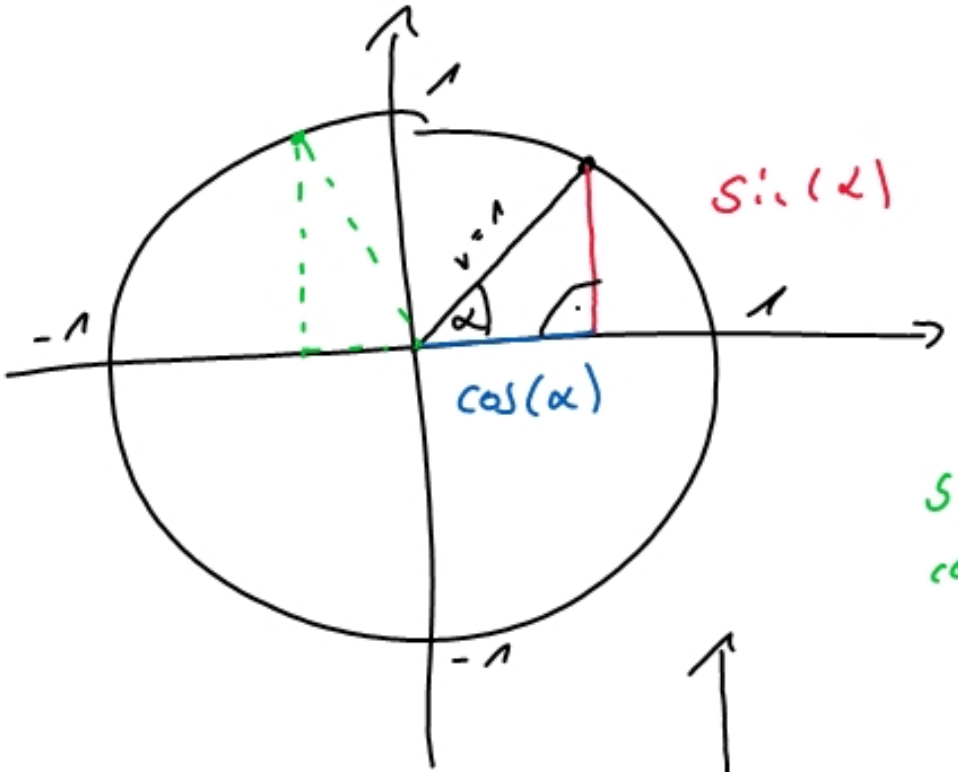
$S(7|6)$

2) $\begin{vmatrix} \frac{1}{3}y + \frac{1}{6}x = \frac{1}{15} \\ 3\frac{1}{2}x = 3\frac{1}{5} - 3y \end{vmatrix} \quad | \cdot 30 \quad | \cdot 10$ $\quad \begin{vmatrix} 10y + 5x = 2 \\ 15x = 6 - 30y \end{vmatrix} \quad | : 3 \ldots$

$30y = 6 - 15x \qquad 15x - 6 = -30y$

$0 = 0$

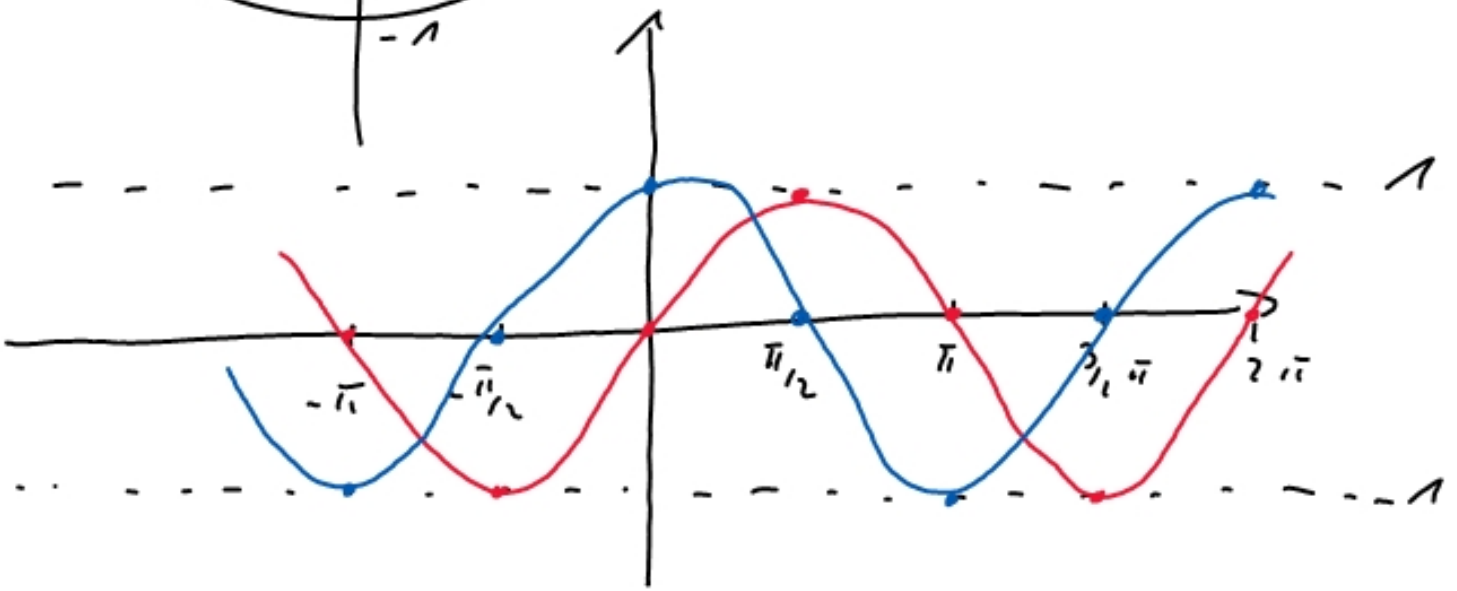
$\mathbb{L} = \mathbb{R}$



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

$\sin 100° \approx 0{,}8$

$\cos 100° \approx -0{,}2$



$$f(x) = 3 \cdot \underbrace{\cos\left(\tfrac{1}{2}x + \tfrac{3}{2}\pi\right)}_{\cos(\frac{1}{2}x)\cdot\underbrace{\cos(\frac{3}{2}\pi)}_{0} - \sin(\frac{1}{2}x)\cdot\underbrace{\sin(\frac{3}{2}\pi)}_{-1}} - 4$$

$$f(x) = 3 \cdot \sin\left(\tfrac{1}{2}x\right) - 4$$

<u>1w:</u> $\quad 3 \cdot [-1;1] - 4 = [-3;3] - 4 \Rightarrow y \in [-7;-1]$

<u>Symmetrie:</u> Punktsymmetrie zu $(0|-4)$

$$f(x) + 4 = -[f(-x) + 4]$$

$$\left(3 \cdot \sin\left(\tfrac{1}{2}x\right) - 4\right) + 4 = -\left[\left(3 \cdot \sin\left(-\tfrac{1}{2}x\right) - 4\right) + 4\right]$$

$$3 \cdot \sin\left(\tfrac{1}{2}x\right) = -3 \cdot \sin\left(-\tfrac{1}{2}x\right) \qquad |\cdot\left(\tfrac{1}{3}\right|$$

$$\sin\left(\tfrac{1}{2}x\right) = -\sin\left(-\tfrac{1}{2}x\right) \checkmark, \text{ da } \sin(-x) = -\sin(x)$$

$$f(x) = 3 \cdot \sin(1/2 x) - 4 \qquad P_{per} = \frac{2\pi}{1/2} = 4\pi$$

$$f(x) = f(x + 4\pi)$$

$$= 3 \cdot \sin\left[1/2 \cdot (x + 4\pi)\right] - 4$$

$$= 3 \cdot \sin\left(1/2 x + 2\pi\right) - 4$$

$$= 3 \cdot \left[\sin(1/2 x) \cdot \underbrace{\cos(2\pi)}_{1} + \underbrace{\sin(2\pi)}_{0} \cdot \cos(1/2 x)\right] - 4$$

$$= 3 \cdot \sin(1/2 x) - 4 = f(x) \quad \checkmark$$

$$f(x) = 1/2 \cdot \underbrace{\sin\left(\tfrac{1}{4}x + 3{,}5\pi\right)}_{\sin(\frac{1}{4}x)\cdot\cos(3{,}5\pi) + \sin(3{,}5\pi)\cdot\cos(\frac{1}{4}x)} - 3/2$$

$\cos(3{,}5\pi) = 0$, $\sin(3{,}5\pi) = -1$

$$f(x) = -1/2 \cdot \cos(\tfrac{1}{4}x) - 3/2$$

W: $-1/2\,[-1;1] - 3/2 = [-1/2;1/2] - 3/2 \Rightarrow y \in [-2;-1]$

<u>Symmetrie</u>: $f(x) = f(-x)$

$$-1/2 \cdot \cos(\tfrac{1}{4}x) - 3/2 = -1/2 \cdot \cos(-\tfrac{1}{4}x) - 3/2 \quad | + 3/2$$

$$\cdot(-2)$$

$$\cos(\tfrac{1}{4}x) = \cos(-\tfrac{1}{4}x) \quad \checkmark$$

$$\cos(x) = \cos(-x)$$

Periodo · $f(x) = -\frac{1}{2}\cdot\cos\left(\frac{1}{4}x\right) - \frac{3}{2}$, $P_{\text{fund}} = \frac{2\pi}{\frac{1}{4}} = 8\pi$

$$f(x) = f(x+8\pi)$$

$$= -\frac{1}{2}\cdot\cos\left[\frac{1}{4}(x+8\pi)\right] - \frac{3}{2}$$

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

$$= -\frac{1}{2}\cdot\left[\cos\left(\frac{1}{4}x\right)\cdot\underbrace{\cos(2\pi)}_{1} - \sin\left(\frac{1}{4}x\right)\cdot\underbrace{\sin(2\pi)}_{0}\right] - \frac{3}{2}$$

$$= -\frac{1}{2}\cdot\cos\left(\frac{1}{4}x\right) - \frac{3}{2} = f(x) \quad \checkmark$$