

INEQUAÇÕES TRIGONOMÉTRICAS

· INTRODUÇÃO ·

· CASOS GERAIS ·

↪ $\text{sen } x > a$

↪ $\text{sen } x < a$

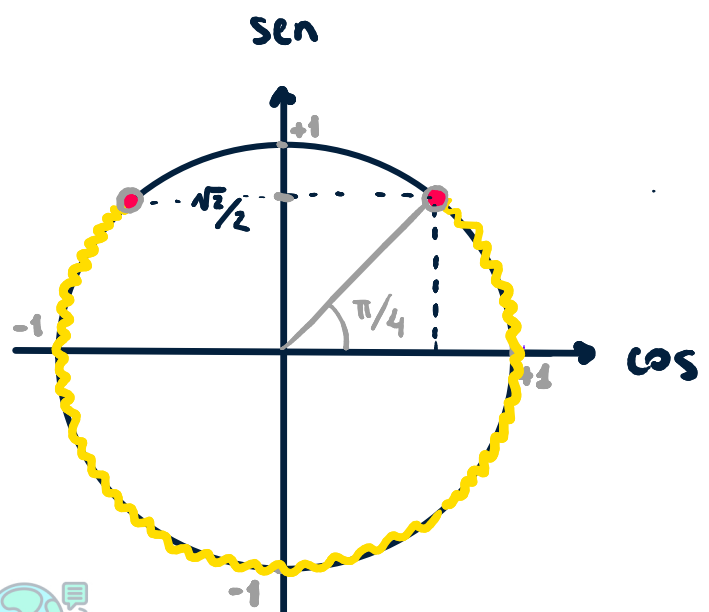
↪ $\text{cos } x > a$

↪ $\text{cos } x < a$

↪ $\text{tg } x > a$

↪ $\text{tg } x < a$

Ex.: $\text{sen } x < \frac{\sqrt{2}}{2}$

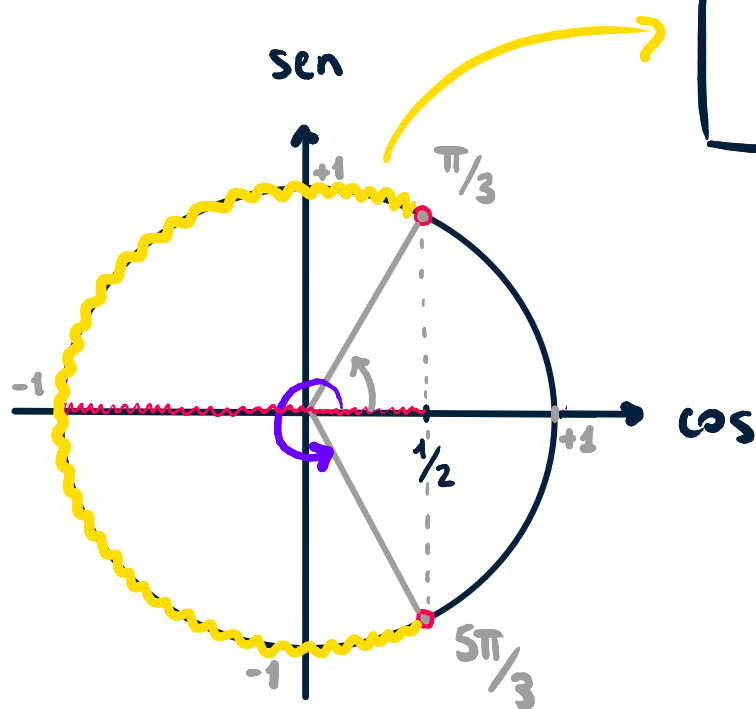


INEQUAÇÕES COM COSSENO.

EXEMPLO 01

Resolva a inequação $\cos x < \frac{1}{2}$ p/ $x \in [0, 2\pi]$

R :



$$\frac{\pi}{3} \leq x \leq \frac{5\pi}{3}$$



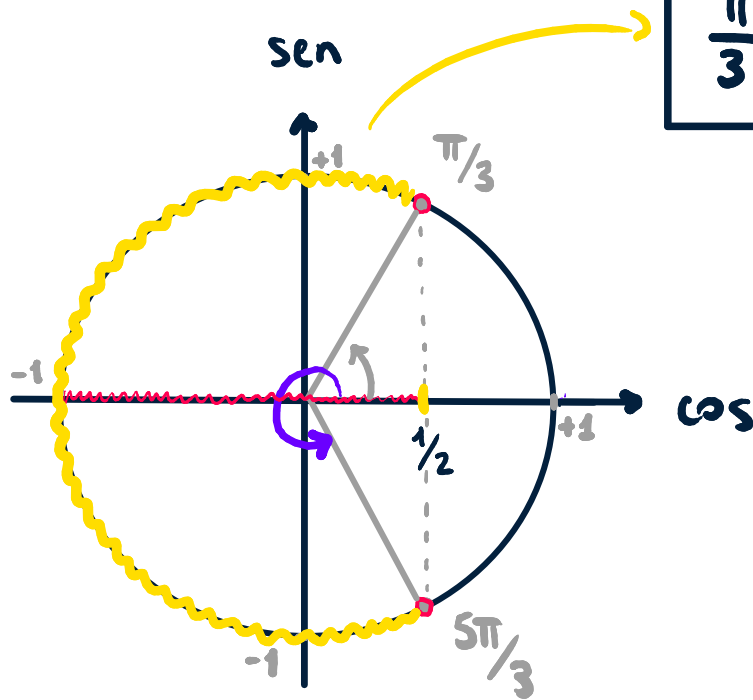
$$\cos x < \frac{1}{2}$$



EXEMPLO 02

Resolva a inequação $\cos x < \frac{1}{2}$ p/ $x \in \mathbb{R}$

R :



$$\frac{\pi}{3} + 2k\pi < x < \frac{5\pi}{3} + 2k\pi$$

$$k \in \mathbb{Z}$$



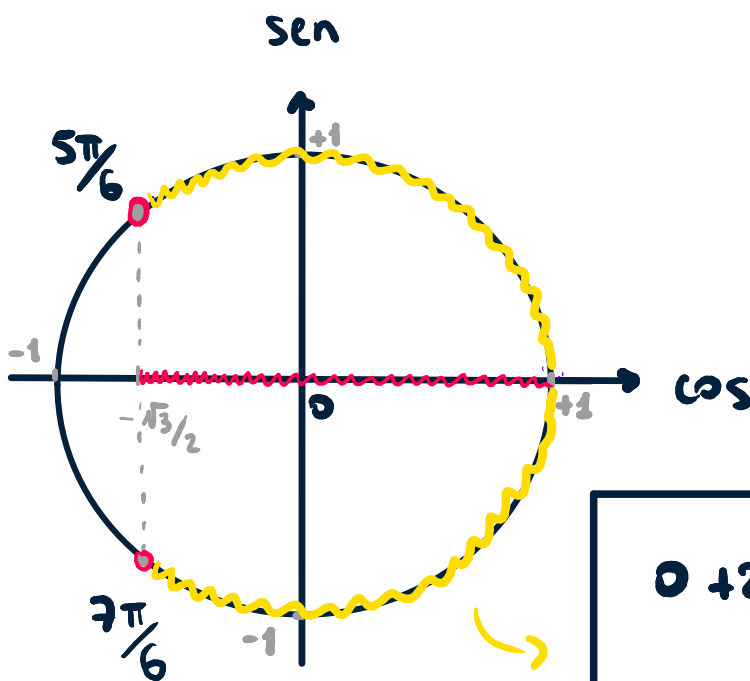
$$\cos x < \frac{1}{2}$$



EXEMPLO 03

Resolva a inequação $\cos x > -\frac{\sqrt{3}}{2}$

R :



$$0 + 2K\pi < x < \frac{5\pi}{6} + 2K\pi$$

ou

$$\frac{7\pi}{6} + 2K\pi < x < 2\pi + 2K\pi$$

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

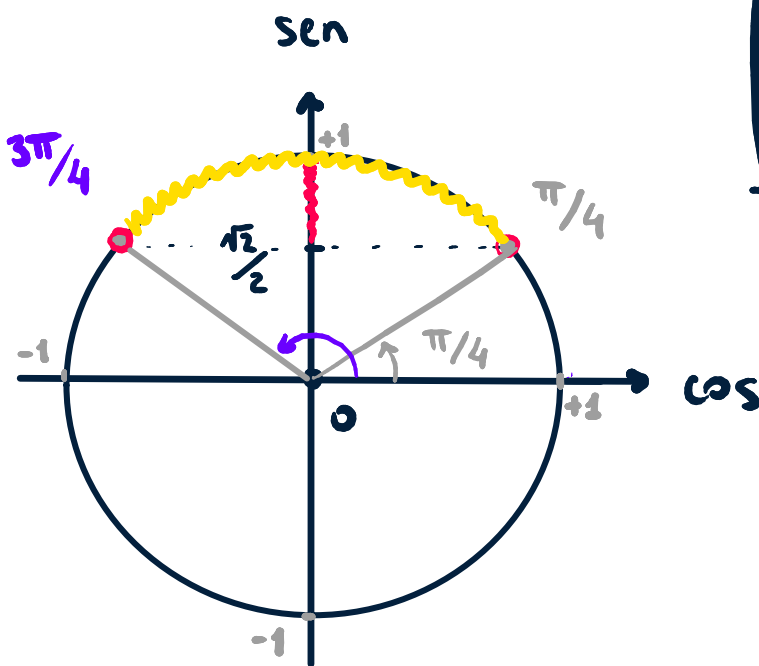


• INEQUAÇÕES COM SENO •

EXEMPLO 01

Resolva a inequação $\text{sen } x > \frac{\sqrt{2}}{2}$ p/ $x \in [0, 2\pi]$

R :



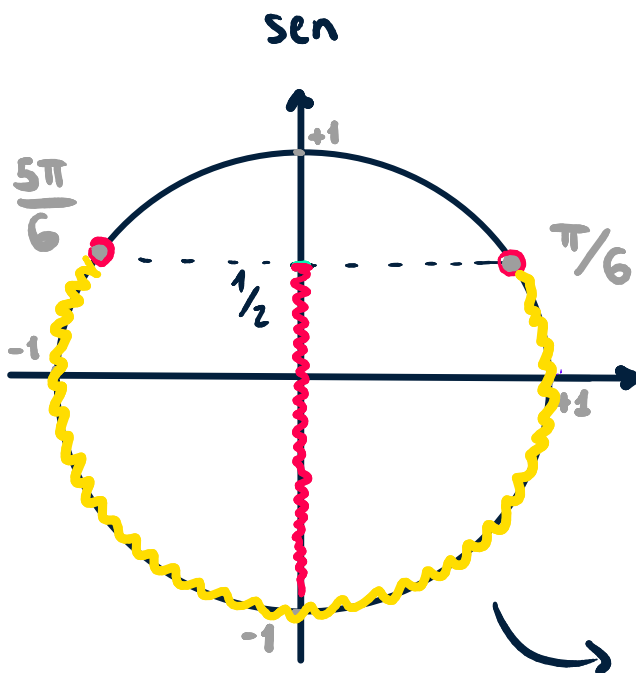
$$\boxed{\frac{\pi}{4} < x < \frac{3\pi}{4}}$$



EXEMPLO 02

Resolva a inequação $\text{sen } x \leq \frac{1}{2}$ $\forall x \in [0, 2\pi]$

R :



$$0 \leq x \leq \frac{\pi}{6}$$

ou

$$\frac{5\pi}{6} \leq x \leq 2\pi$$

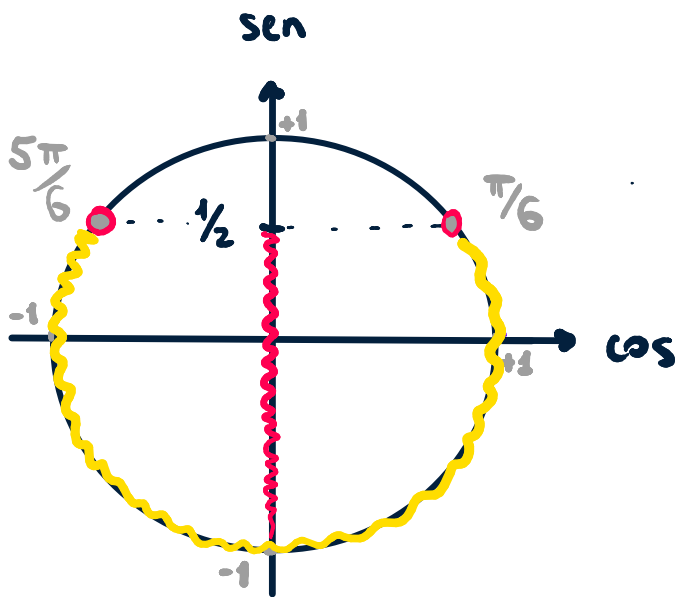


EXEMPLO 03

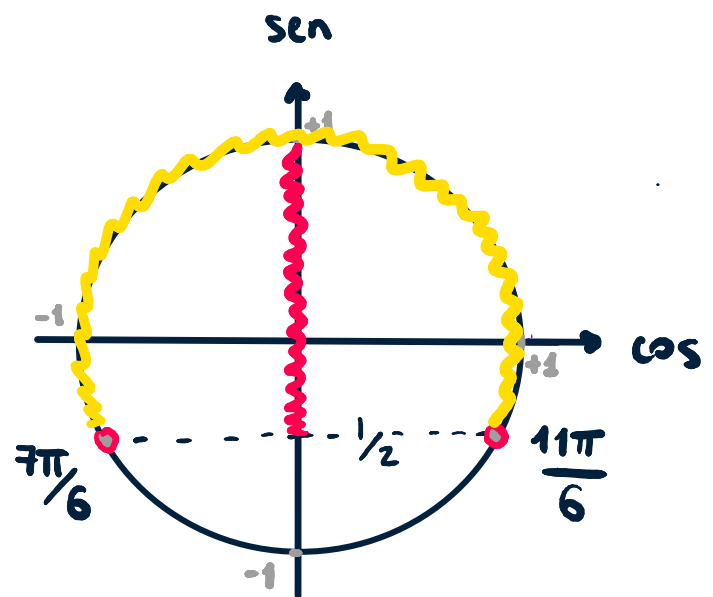
Resolva a inequação $-\frac{1}{2} < \text{sen } x < \frac{1}{2}$, $x \in [0, 2\pi]$

R :

$$\text{sen } x < \frac{1}{2}$$



$$-\frac{1}{2} < \text{sen } x$$

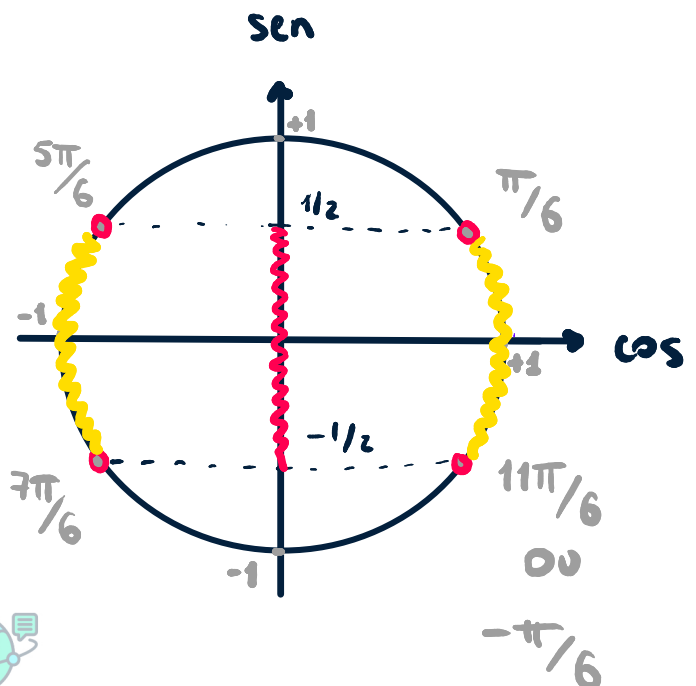


Solução Final :

$$-\frac{\pi}{6} < x < \frac{\pi}{6}$$

ou

$$\frac{5\pi}{6} < x < \frac{7\pi}{6}$$

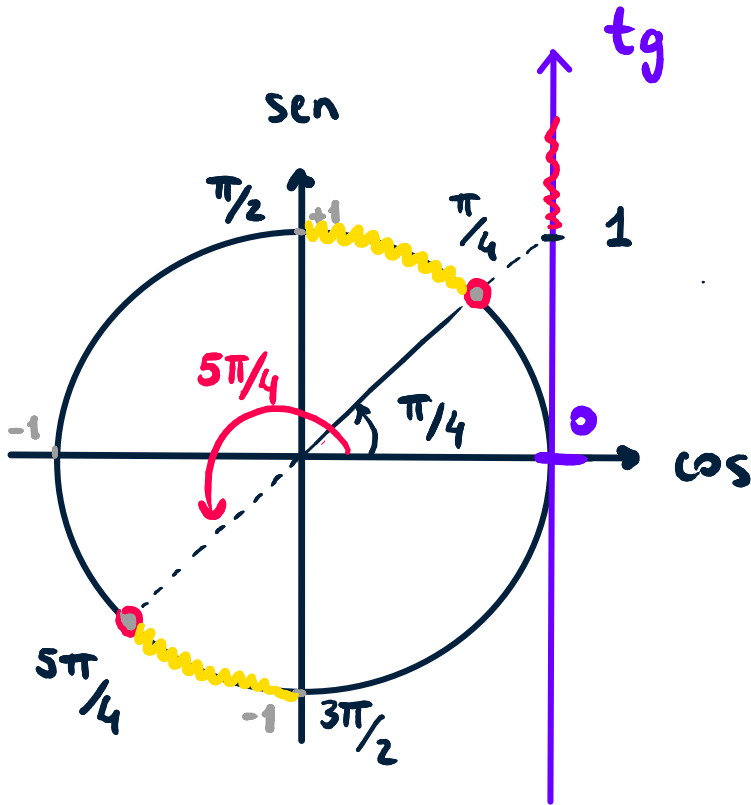


• INEQUAÇÕES COM TANGENTE •

EXEMPLO 01

Resolva a inequação $\operatorname{tg} x > 1$ p/ $x \in [0, 2\pi]$

R:



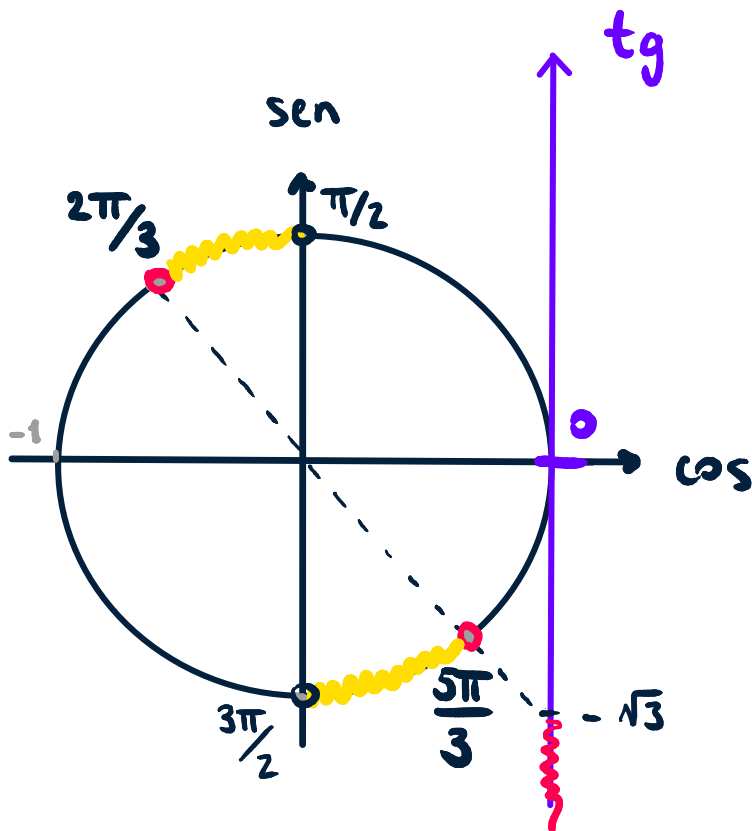
A hand-drawn diagram of a unit circle. The circle is represented by a dashed line. Four points are marked on the circle with 'x' symbols. The angles for these points are written in radians: $\pi/4$ at the top-left, $\pi/2$ at the top-right, $3\pi/2$ at the bottom-right, and $5\pi/4$ at the bottom-left. The x-coordinates for these points are written below the circle: $\cos(\pi/4)$ and $\cos(5\pi/4)$ are both labeled as $1/\sqrt{2}$, and $\cos(\pi/2)$ and $\cos(3\pi/2)$ are both labeled as 0 .



EXEMPLE 02

Resolva a inequação $\operatorname{tg} x < -\sqrt{3}$ p/ $x \in [0, 2\pi]$

R:



$$\frac{\pi}{2} < x < \frac{2\pi}{3}$$
$$\cup$$
$$\frac{3\pi}{2} < x < \frac{5\pi}{3}$$



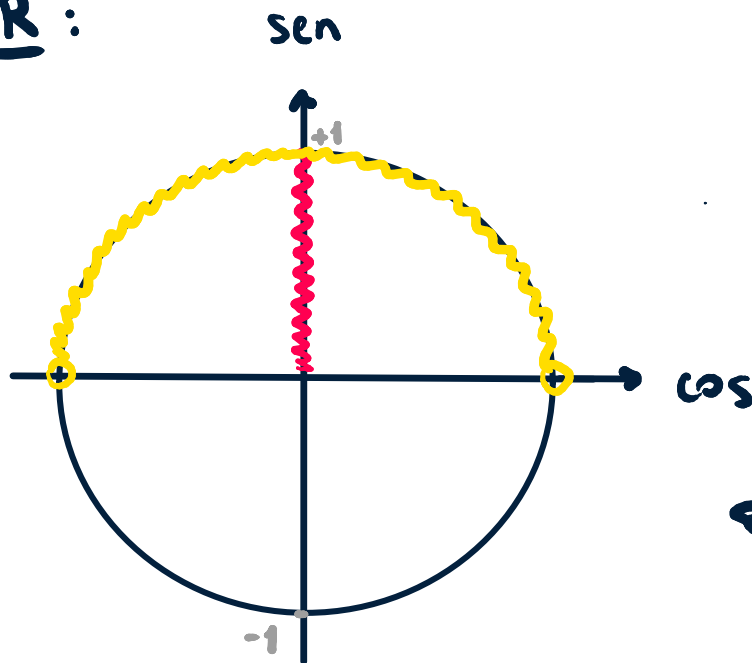
· OUTRAS INEQUAÇÕES ·

EXEMPLO 01

Resolva a inequação $\text{sen } x > \cos(x - \pi/3)$

p/ $x \in [0, 2\pi]$

R :



$$\text{sen } \theta > 0$$

$$\hookrightarrow 0 < \theta < \pi$$

$$0 < x - 5\pi/12 < \pi$$

$$5\pi/12 < x < 17\pi/12$$

$$\text{sen } x > \text{sen}(5\pi/6 - x)$$

$$\text{sen } x - \text{sen}(5\pi/6 - x) > 0$$

$$\overset{+}{2} \text{sen}(x - 5\pi/12) \cdot \overset{+}{\cos}(5\pi/12) > 0$$

$$\text{sen}(x - 5\pi/12) > 0$$

$$\theta = (x - 5\pi/12)$$

EXEMPLO 02

Resolva a inequação $1 - 2 \cdot \text{sen } x \geq \cos^2 x$

$\forall x \in \mathbb{R}$.

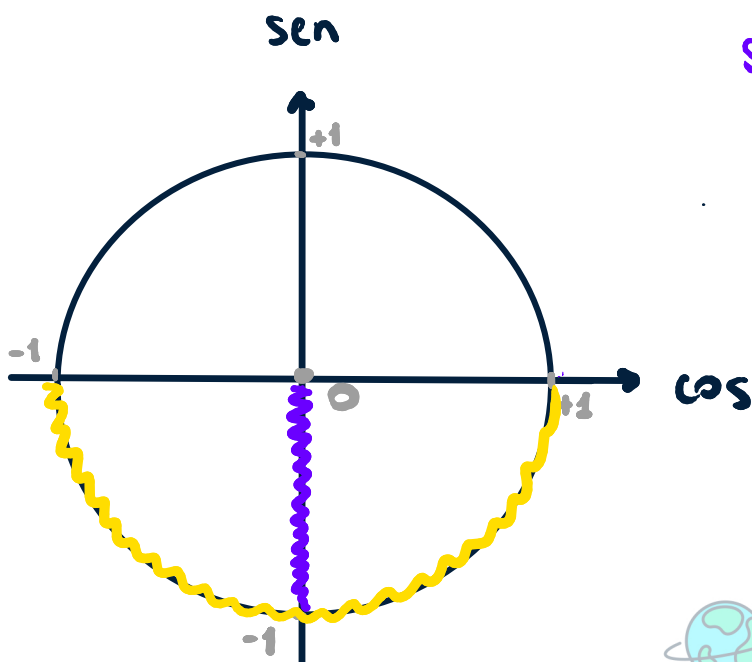
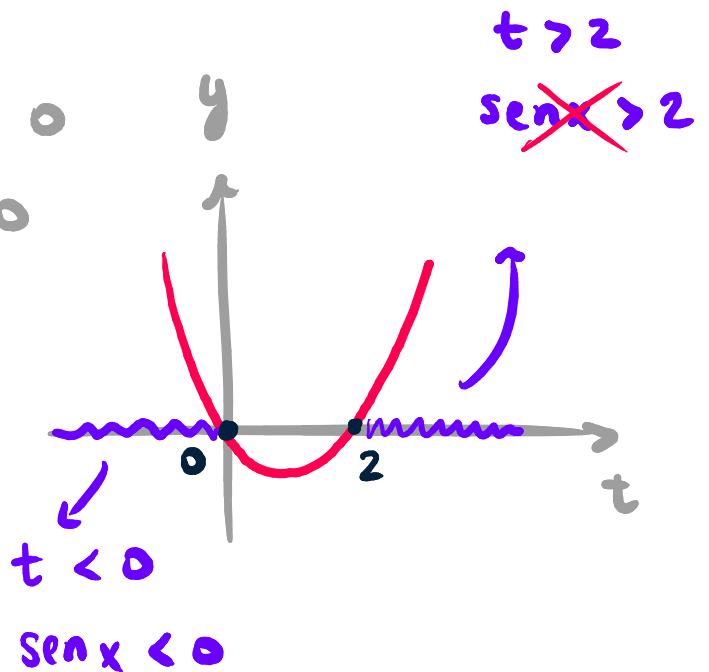
$$\underline{R}: \cancel{1} - 2 \cdot \text{sen } x \geq \cancel{1} - \text{sen}^2 x$$

$$\text{sen}^2 x - 2 \text{sen } x \geq 0$$

$$\text{sen } x = t \rightarrow t^2 - 2t \geq 0$$

$$y(t) \geq 0$$

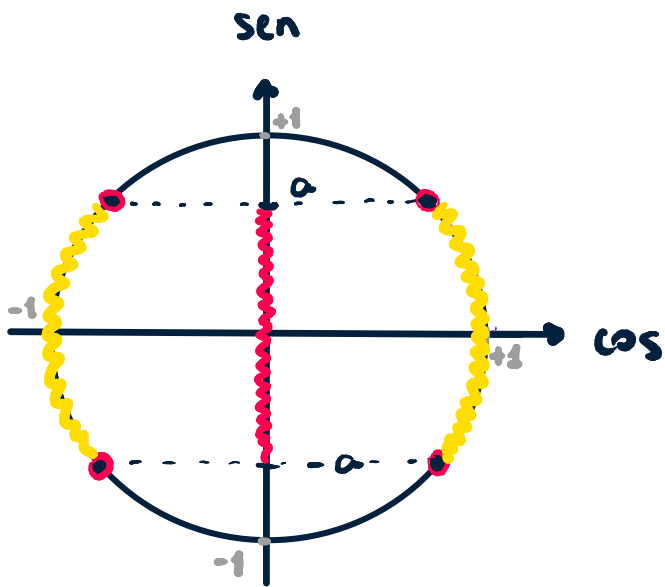
$$y(t) = t^2 - 2t$$



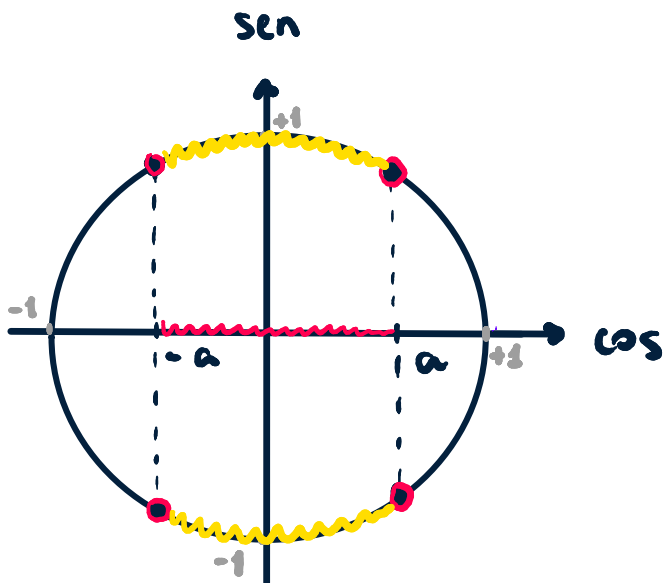
$$\pi + 2k\pi < x < 2\pi + 2k\pi$$
$$k \in \mathbb{Z}$$



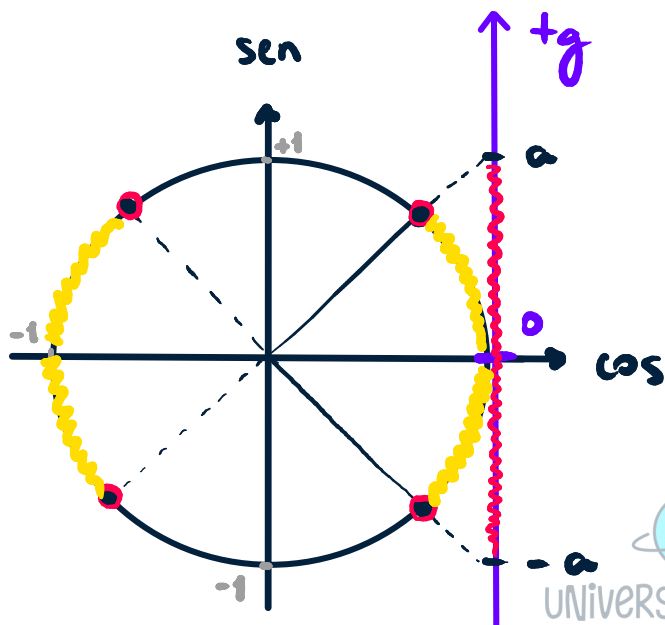
RESUMO



$$-a < \text{sen } x < a$$



$$-a < \cos x < a$$



$$-a < \text{tg } x < a$$

