

$$f(z) = \operatorname{sen} z$$

$$w = \operatorname{sen} z$$

$$u + iv = \operatorname{sen} x \operatorname{cosh} y + i \operatorname{cos} x \operatorname{senh} y$$

$$u = \operatorname{sen} x \operatorname{cosh} y$$

$$v = \operatorname{cos} x \operatorname{senh} y$$

Rectas $x = a$
 $0 < a < \frac{\pi}{2}$
 $y > 0$

$$\begin{cases} u = \operatorname{sen} a \operatorname{cosh} y > 0 \\ v = \operatorname{cos} a \operatorname{senh} y > 0 \end{cases} \left. \begin{array}{l} \frac{u}{\operatorname{sen} a} = \operatorname{cosh} y \\ \frac{v}{\operatorname{cos} a} = \operatorname{senh} y \end{array} \right\}$$

$$\frac{u^2}{\operatorname{sen}^2 a} - \frac{v^2}{\operatorname{cos}^2 a} = 1$$

→ hipérbola.

$x = 0$
 $y > 0$

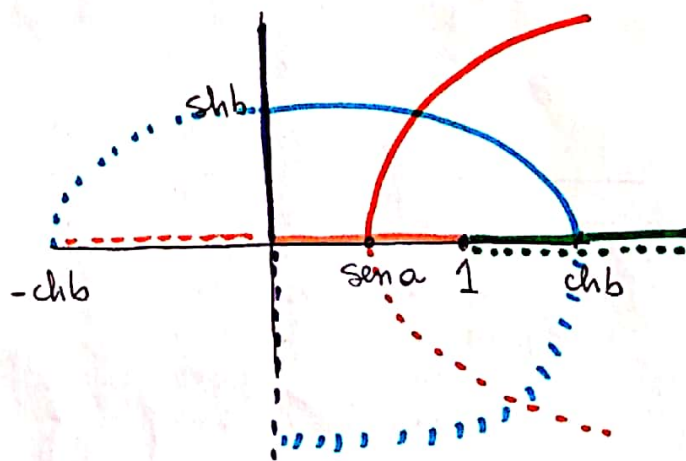
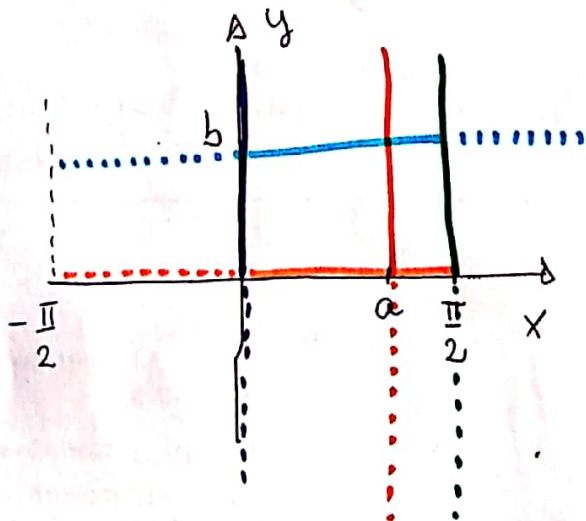
$$\begin{cases} u = 0 \\ v = \operatorname{senh} y > 0 \end{cases}$$

→ semieje imag. positiva

$x = \frac{\pi}{2}$
 $y > 0$

$$\begin{cases} u = \operatorname{cosh} y > 1 \\ v = 0 \end{cases}$$

→ semirecta real $u > 1$



Rectas $y = b > 0$
 $0 < x < \frac{\pi}{2}$

$$\begin{cases} u = \operatorname{sen} x \operatorname{ch} b > 0 \\ v = \operatorname{cos} x \operatorname{sh} b > 0 \end{cases}$$

$$\frac{u}{\operatorname{ch} b} = \operatorname{sen} x$$

$$\frac{v}{\operatorname{sh} b} = \operatorname{cos} x$$

$$\frac{u^2}{(\operatorname{ch} b)^2} + \frac{v^2}{(\operatorname{sh} b)^2} = 1$$

→ elipses.

$$y = 0$$

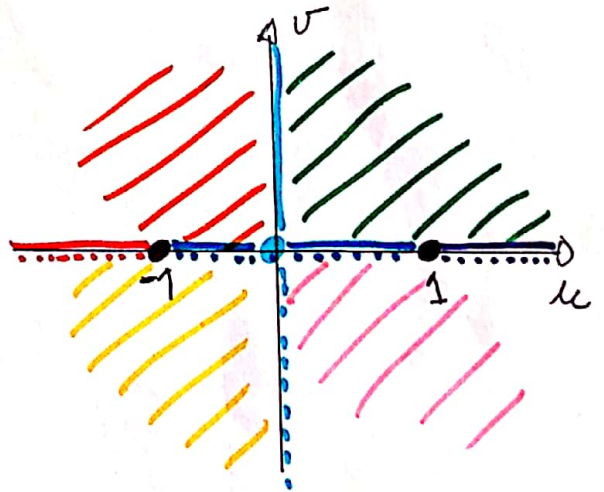
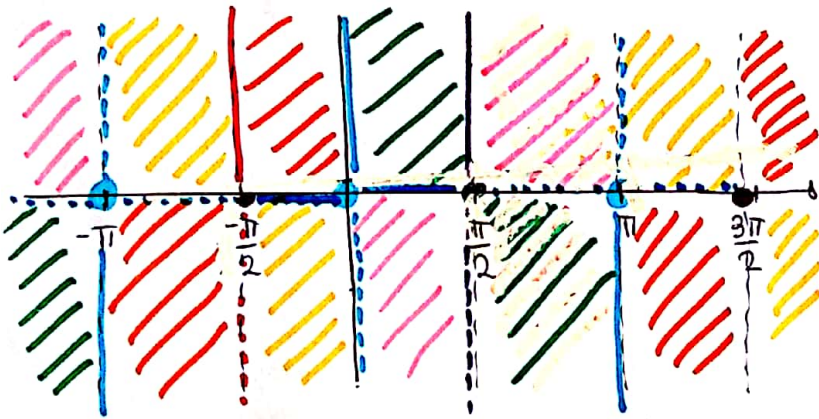
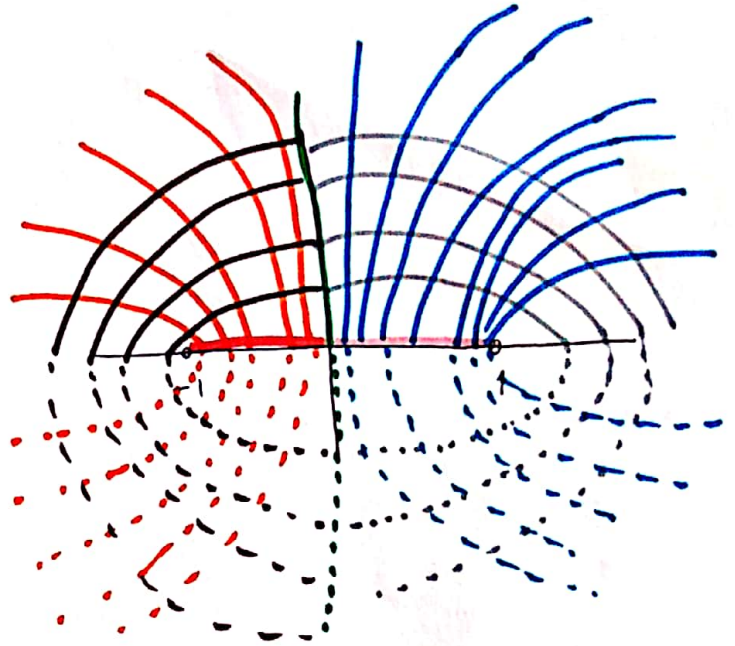
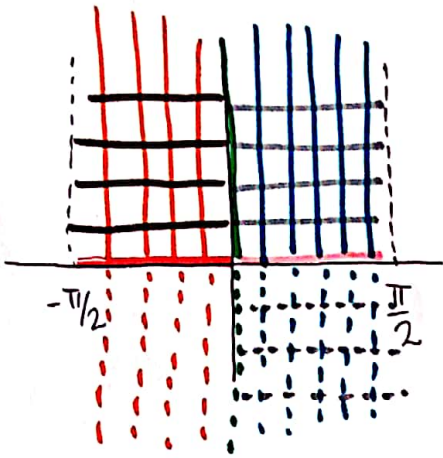
$$0 < x < \frac{\pi}{2}$$

$$u = \lambda \sin x$$

$$v = 0$$

$$0 < u < 1$$

$$v = 0$$



$$\sin(z) = -\sin(z + \pi)$$

$$\sin(-z) = -\sin z$$