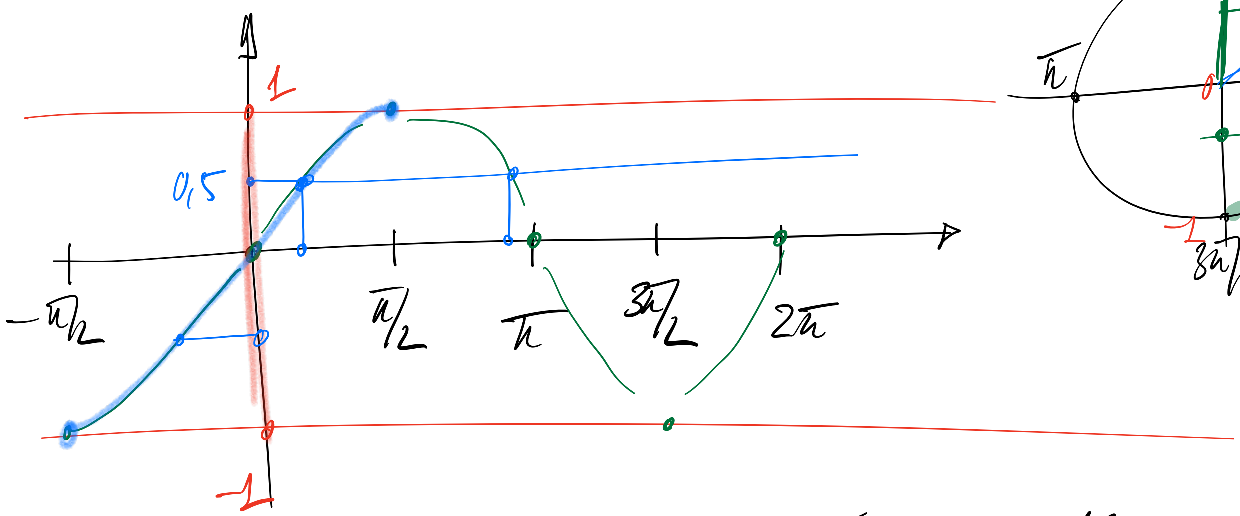
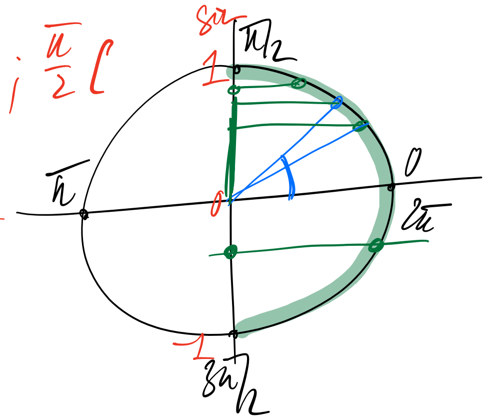
2.

$\arcsin : [-1;1] \longrightarrow]-\frac{\pi}{2};\frac{\pi}{2}[$





$\cancel{\sin(x) = 2}$

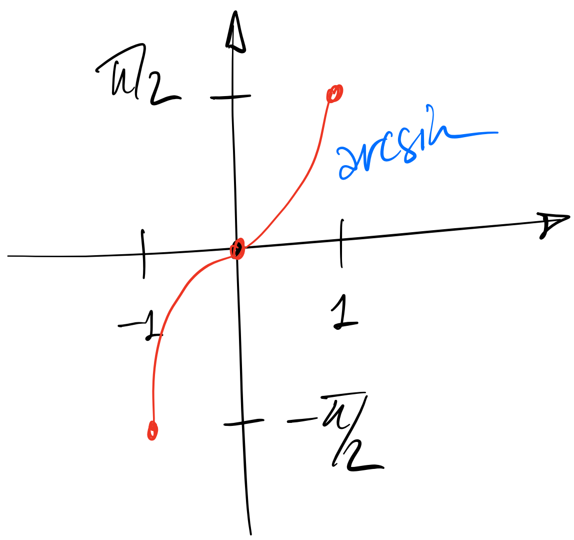
~~injectif~~ ~~surjectif~~

$\sin : \mathbb{R} \longrightarrow \cancel{\mathbb{R}}$

$[-\frac{\pi}{2};\frac{\pi}{2}] \xrightarrow{\sim} [-1;1]$

surjectif

$\arcsin : [-1;1] \longrightarrow [-\frac{\pi}{2};\frac{\pi}{2}]$



Derivée

$$\arcsin(\underbrace{\sin(x)}_{y}) = x$$

$x \in \left[-\frac{\pi}{2} ; \frac{\pi}{2}\right]$

$$\boxed{\arcsin(y) = x \Leftrightarrow \sin x = y}$$

$$\left(\arcsin(\sin(x))\right)' = x'$$

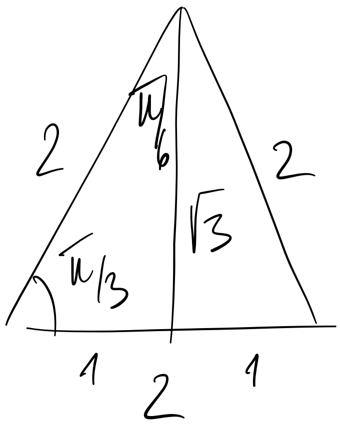
$$\arcsin'(\sin(x)) \cdot \cos(x) = 1$$

$$\arcsin'(\sin(x)) = \frac{1}{\cos(x)}$$

$$\arcsin'(y) = \frac{1}{\cos(x)} = \frac{1}{\sqrt{1-\sin^2(x)}} = \frac{1}{\sqrt{1-y^2}}$$

$$\boxed{\sin^2(x) + \cos^2(x) = 1} \Rightarrow \cos^2(x) = 1 - \sin^2(x)$$

$$\cos(x) = \sqrt{1 - \underbrace{\sin^2(x)}_{y^2}}$$



$$\sin \frac{\pi}{3} = \frac{\sqrt{3}}{2}$$

$$\arcsin \frac{\sqrt{3}}{2} = \frac{\pi}{3}$$