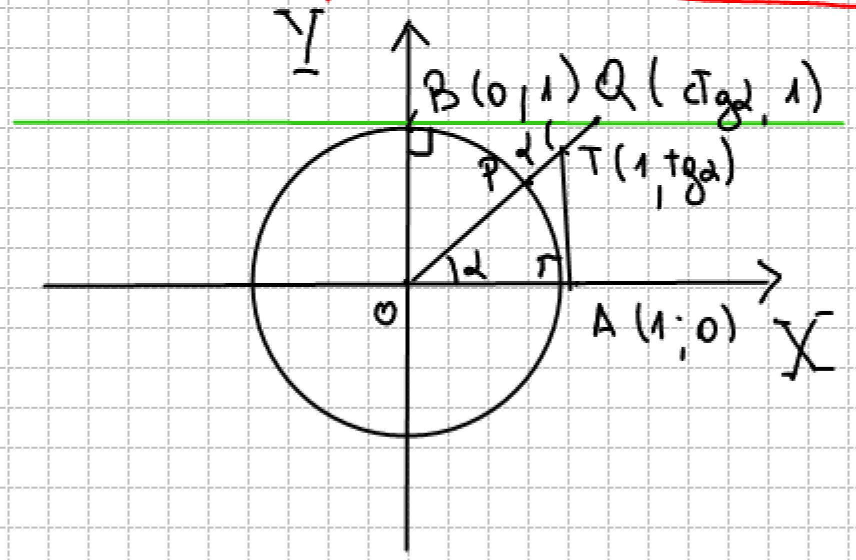
LE FUNZIONI COTANGENTE, COSECANTE, SECANTE

COTANGENTE



$O\hat{Q}B \cong O\hat{A}T$

$\overline{BQ} : \overline{BO} = \overline{OA} : \overline{TA}$

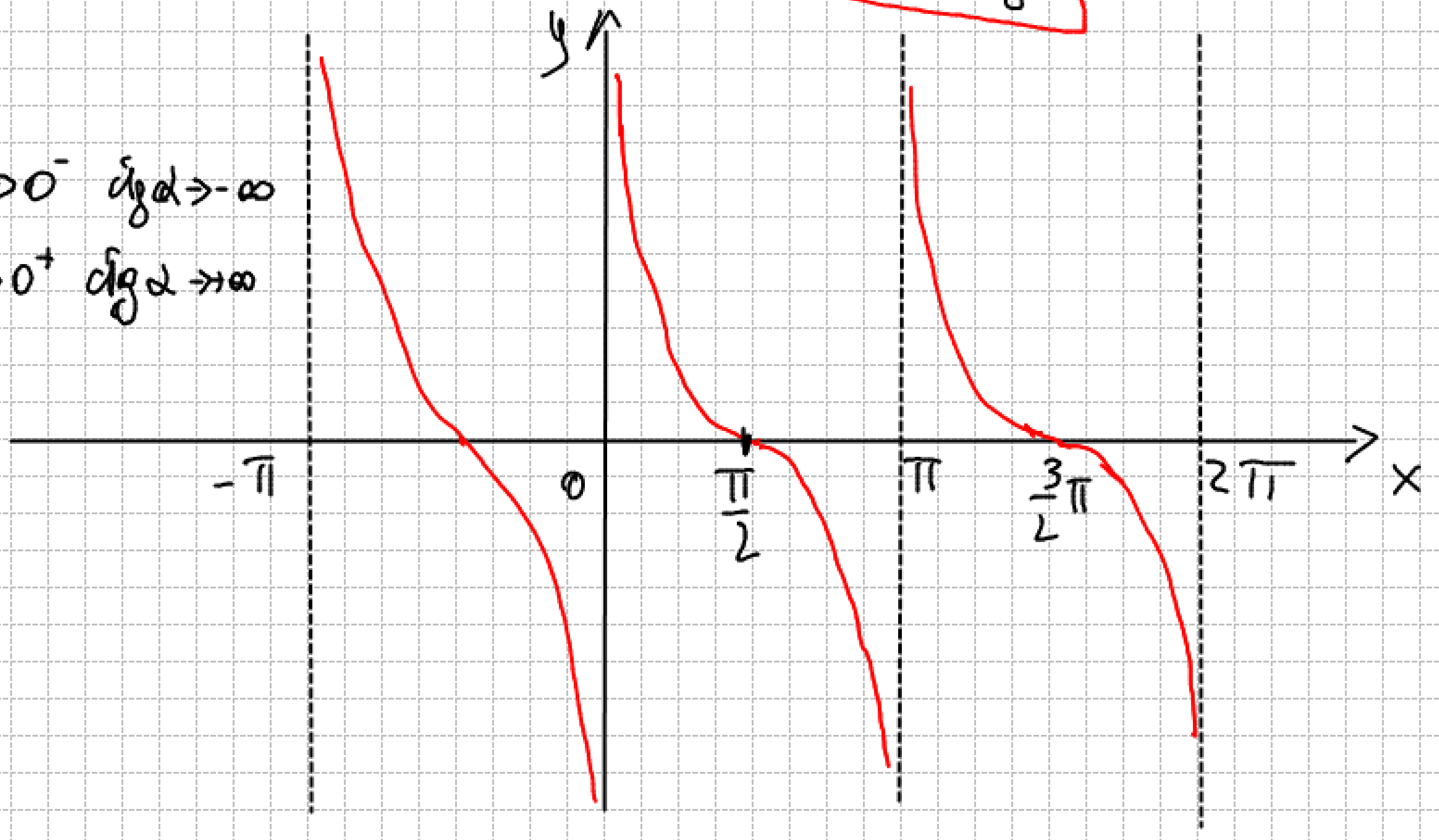
$ctg\,\alpha : 1 = 1 : tg\,\alpha$

$$\boxed{ctg\,\alpha = \frac{1}{tg\,\alpha}}$$

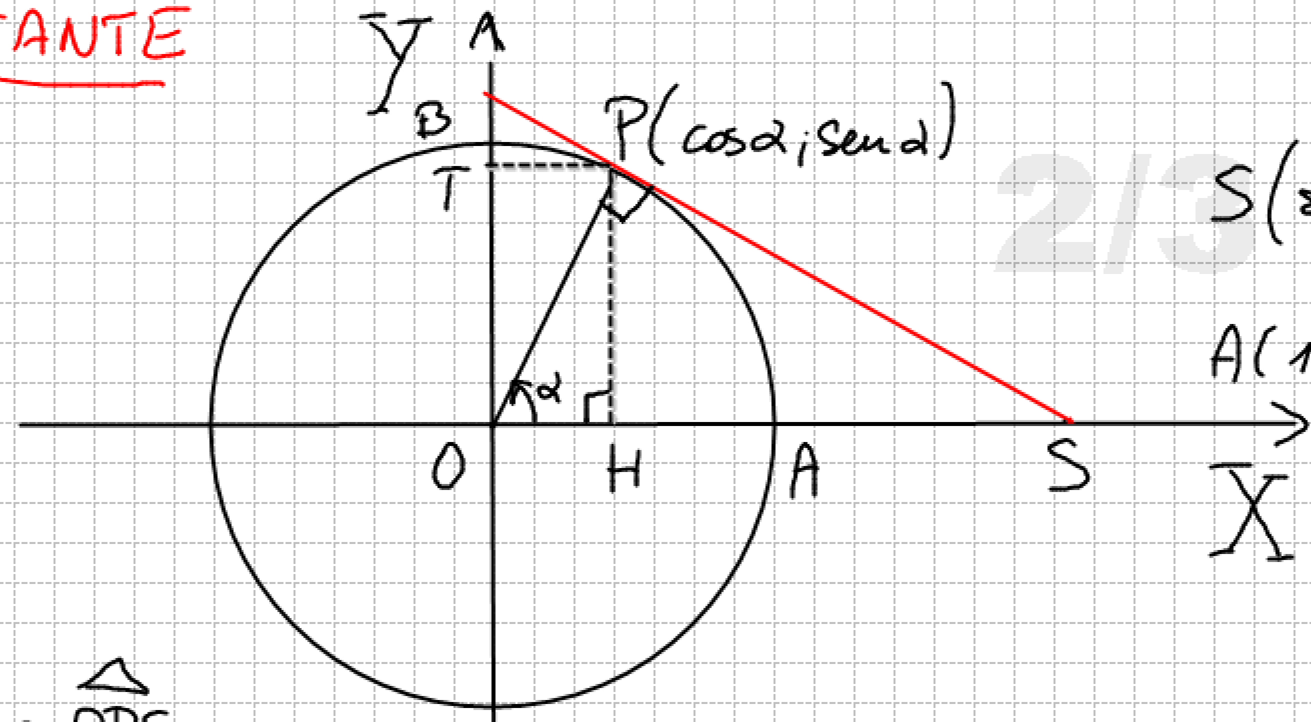
α	$tg\,\alpha$	$ctg\,\alpha = \frac{1}{tg\,\alpha}$
0	0	∞
$\frac{\pi}{6}$	$\frac{1}{\sqrt{3}}$	$\sqrt{3}$
$\frac{\pi}{4}$	1	1
$\frac{\pi}{3}$	$\sqrt{3}$	$\frac{1}{\sqrt{3}}$
$\frac{\pi}{2}$	∞	0

$\alpha \to 0^-$ $ctg\,\alpha \to -\infty$

$\alpha \to 0^+$ $ctg\,\alpha \to +\infty$



SECANTE



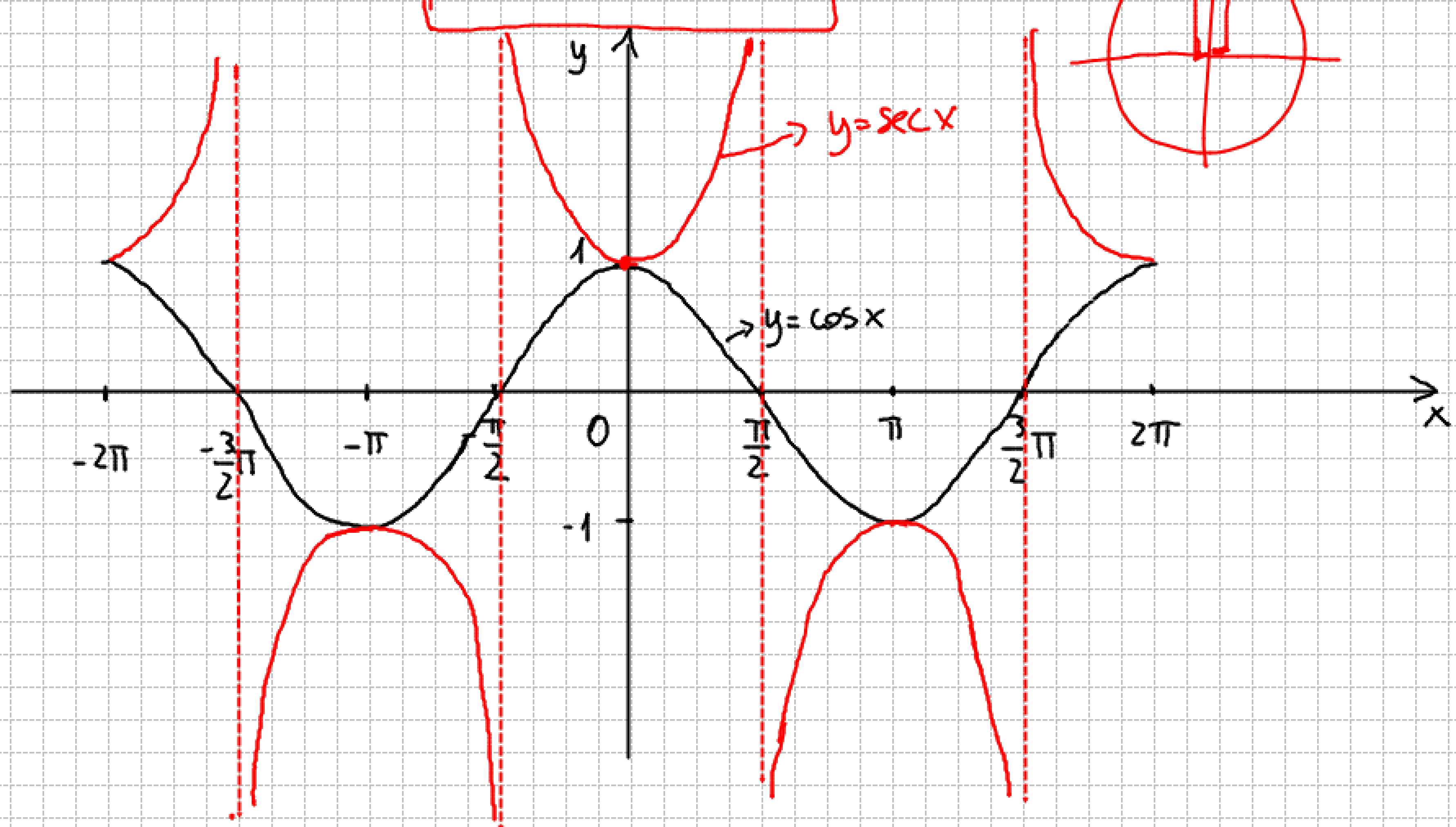
$\overset{\triangle}{OHP}$ e $\overset{\triangle}{OPS}$

sono simili perché sono retti ed hanno α uguale allora i lati sono in proporzione:

$$\overline{OS} : \overline{OP} = \overline{OP} : \overline{OH}$$

$$\sec\alpha : 1 = 1 : \cos\alpha$$

$$\boxed{\sec\alpha = \frac{1}{\cos\alpha}}$$



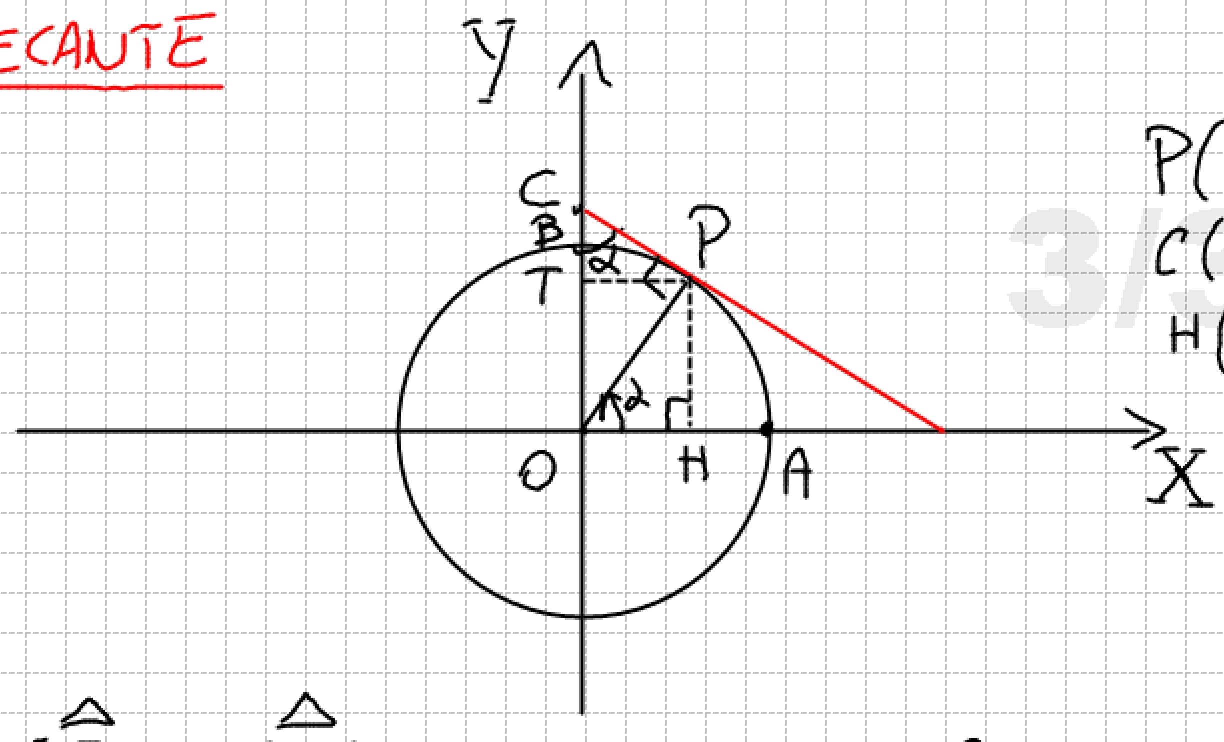
x	cos x	sec x $= \frac{1}{\cos x}$
0	1	1
$\frac{\pi}{2}$	0	∞
π	-1	-1
$\frac{3}{2}\pi$	0	∞

$y = \sec x$ $T = 2\pi$; $y = \sec x$ è pari $\Rightarrow$ $\sec x = \sec(-x)$

$D_{\sec x} = \mathbb{R} - \left\{k\frac{\pi}{2}\right\}; k \in \mathbb{Z}$

$CD_{\sec x} = \left\{x \in \mathbb{R} \,/\, |x| \geq 1\right\} = (-\infty;-1] \cup [1;+\infty)$

COSECANTE



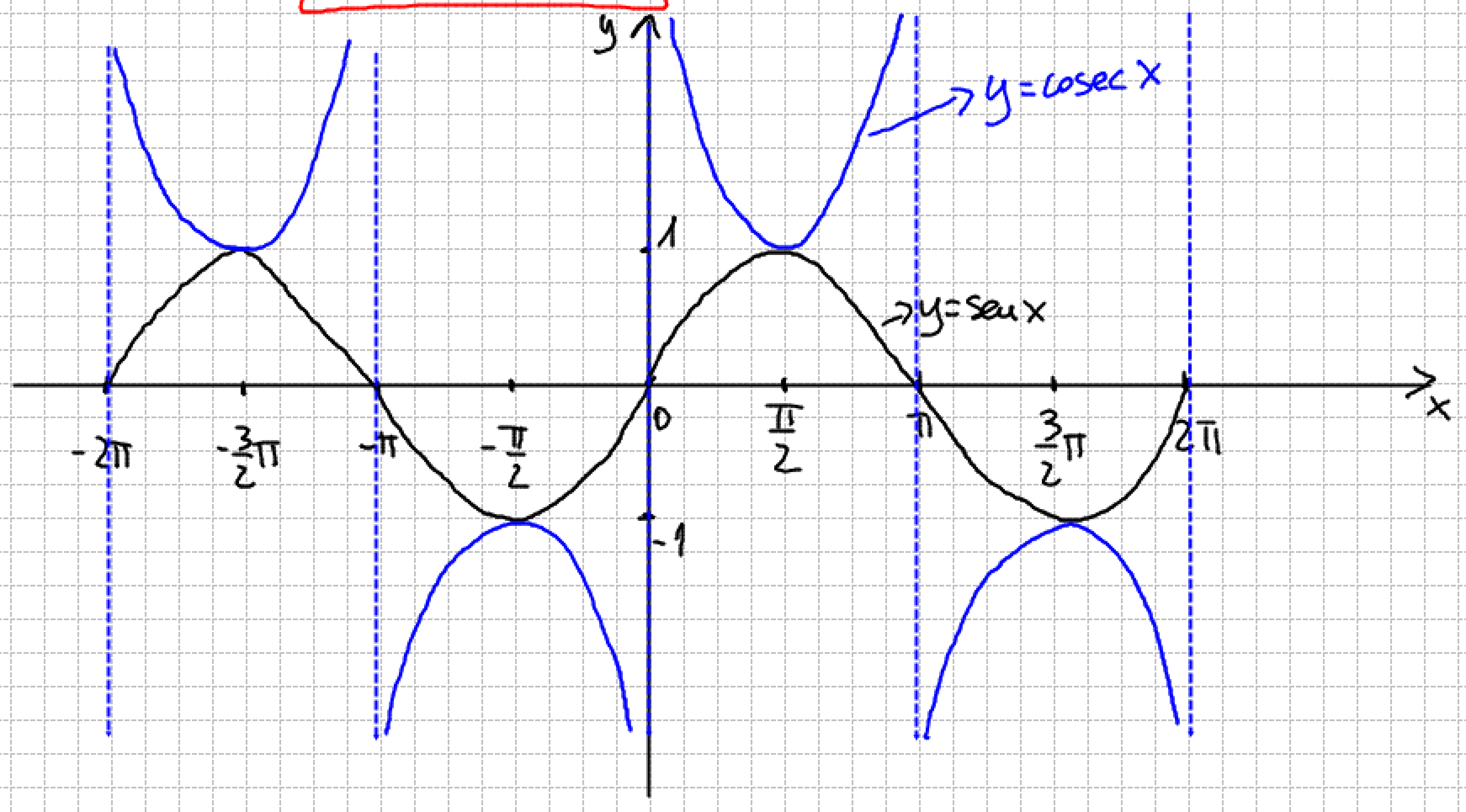
$P(\cos\alpha; \operatorname{sen}\alpha)$
$C(0; \operatorname{cosec}\alpha)$
$H(\cos\alpha; 0)$
$T(0; \operatorname{sen}\alpha)$
$A(1; 0)$
$B(0; 1)$

$\overset{\triangle}{OPC}$ e $\overset{\triangle}{OHP}$: sono simili perché entrambi retti e hanno α uguale allora i lati sono in proporzione:

$$\overline{OC} : \overline{OP} = \overline{OP} : \overline{HP}$$

$$\operatorname{cosec}\alpha : 1 = 1 : \operatorname{sen}\alpha$$

$$\boxed{\operatorname{cosec}\alpha = \frac{1}{\operatorname{sen}\alpha}}$$



x	sen x	cosec x
0	0	∞
$\frac{\pi}{2}$	1	1
π	0	∞
$\frac{3}{2}\pi$	-1	-1
2π	0	∞

$y = \operatorname{cosec} x \qquad T = 2\pi$

$\operatorname{cosec} x = -\operatorname{cosec}(-x) \Rightarrow y = \operatorname{cosec} x$ è dispari (simmetrica rispetto all'origine degli assi).

$D_{\operatorname{cosec}x} = \mathbb{R} - \{k\pi\}, \; k \in \mathbb{Z}$

$CD_{\operatorname{cosec}x} = \{x \in \mathbb{R} \,/\, |x| \geq 1\} =$
$= (-\infty; -1] \cup [1; +\infty).$