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6:

$(13\sin\theta-5)(5\sin\theta-3)=0$

$\tan\theta=\frac{12}{5}$

$\boxed{\sin\theta=\frac{5}{13},\frac{3}{5}}$

15

$8\sin\theta=4+\cos\theta$, $\sin\theta=?$

$8\sin\theta-4=\cos\theta$

$64\sin^2\theta+16-64\sin\theta=\cos^2\theta=1-\sin^2\theta$

$65\sin^2\theta-64\sin\theta+15=0$.

$-39\sin\theta-25\sin\theta$

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14.

$$2 - 2\sin\theta = \cos\theta$$

$$4(1-\sin\theta)^2 = 1-\sin^2\theta$$

$$(1-\sin\theta)\left(4-4\sin\theta-1-\sin\theta\right) = 0$$

$$(1-\sin\theta)(3-5\sin\theta) = 0$$

$$\boxed{\sin\theta = 1, \frac{3}{5}}$$

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$y = x^2 = f(x)$

$$\boxed{\begin{aligned} R_f &= [0, \infty) \\ D_f &= R \end{aligned}}$$

$$\boxed{\begin{aligned} f(x) &= x^3 \\ D_f &= R \\ R_f &= R \end{aligned}}$$

$(-16)^{1/3} = x$

$-2^{4/3} = -2 \cdot 2^{1/3}$

$y = \pi$

$x = \sqrt{\pi}$

$x = -\sqrt{\pi}$

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$$\boxed{\frac{\cos x}{\sin x}} = \boxed{y = \underline{\cot x} = f(x)}$$

$$\boxed{\begin{aligned} D_f &= R - \{n\pi\}, \; n \in I \\ R_f &= R \end{aligned}}$$

x	→	0 to $\frac{\pi}{2}$
$\tan x$		0 to ∞
$\cot x$		∞ to 0

$x \to 0.000\ldots$

$\tan x \to 0.000\ldots 1$

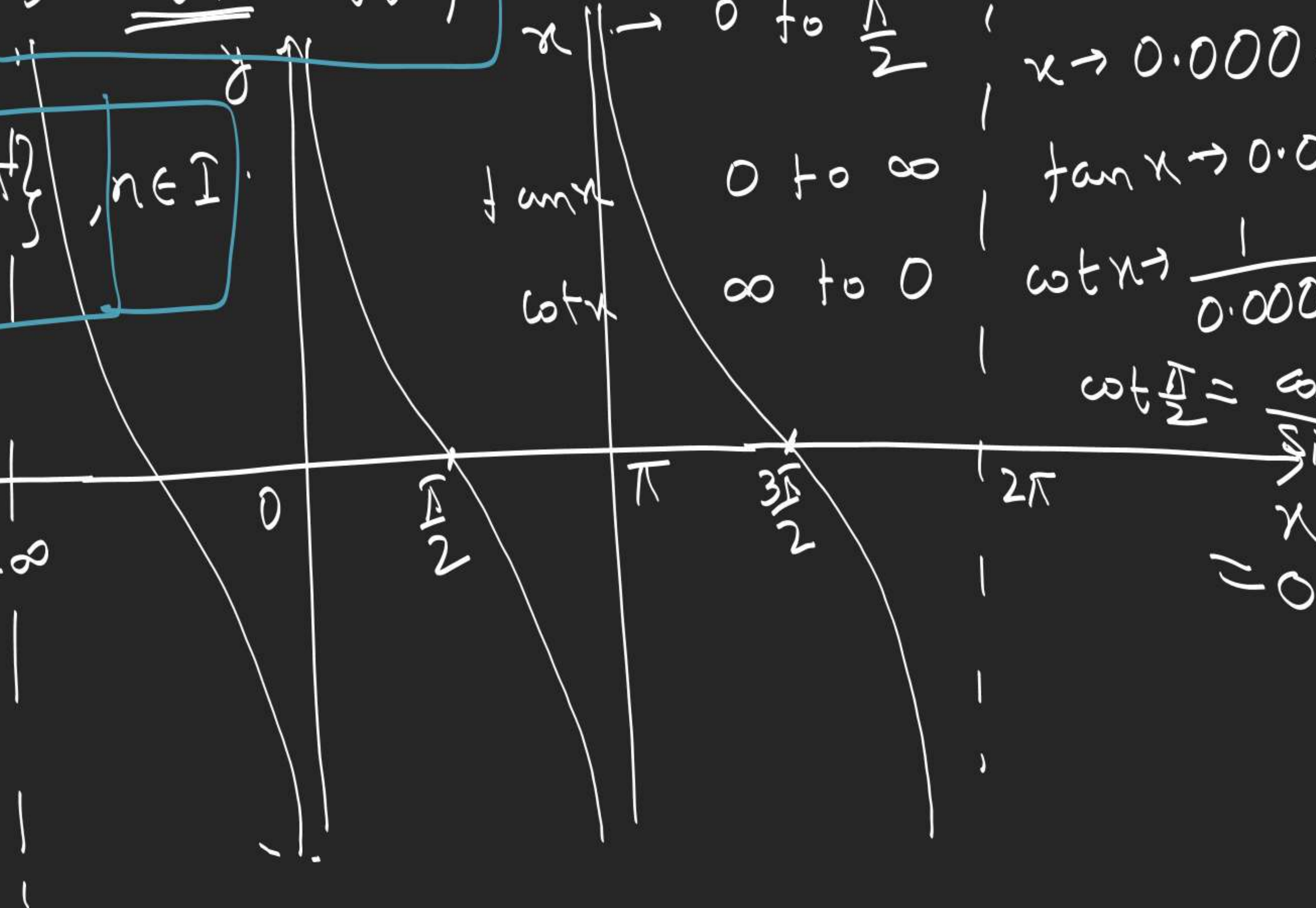
$\cot x \to \frac{1}{0.000\ldots} \to \infty$

$\cot \frac{\pi}{2} = \frac{\cos \frac{\pi}{2}}{\sin \frac{\pi}{2}} = \frac{0}{1} = 0$

$x \to \frac{\pi}{2}$ to π

$\tan x$ $-\infty$ to 0

$\cot x$ 0 to $-\infty$



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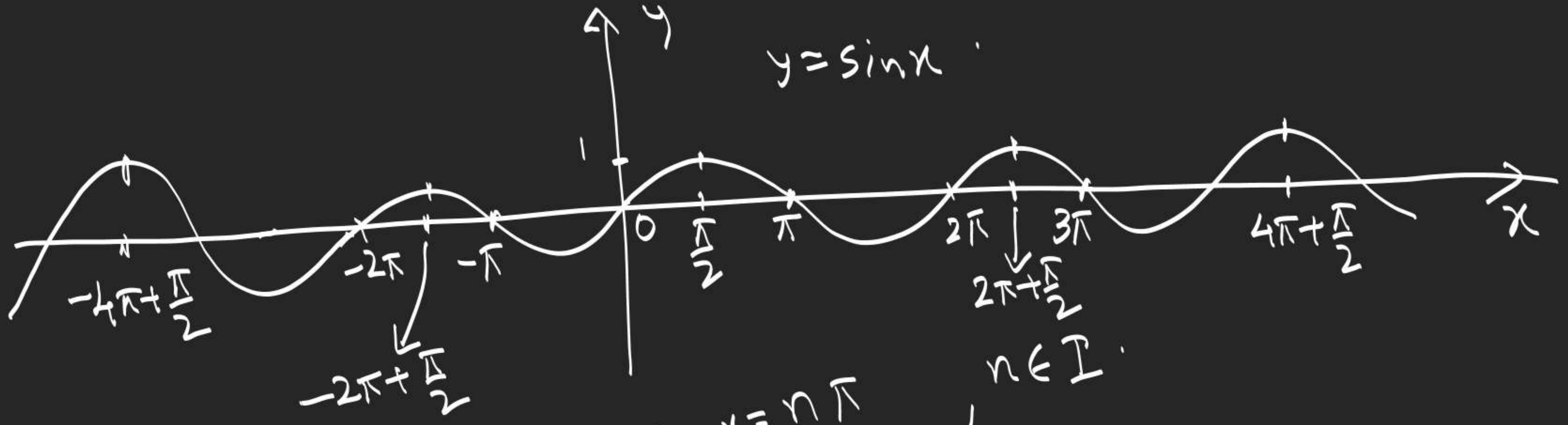
$y = \sin x$



$\sin x = 0, \; x = n\pi, \; n \in I$

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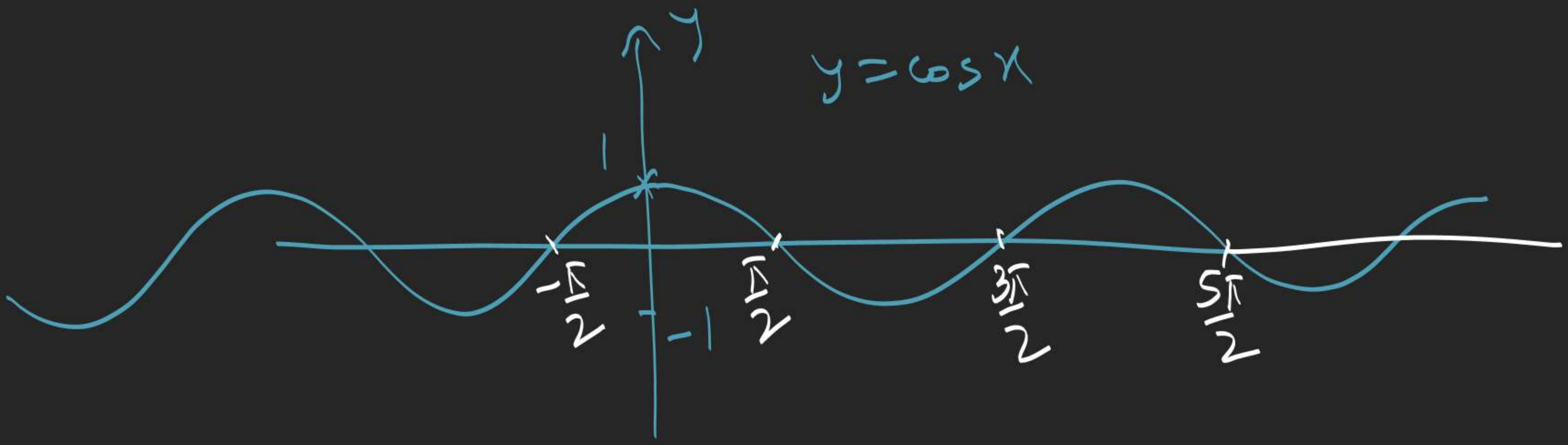

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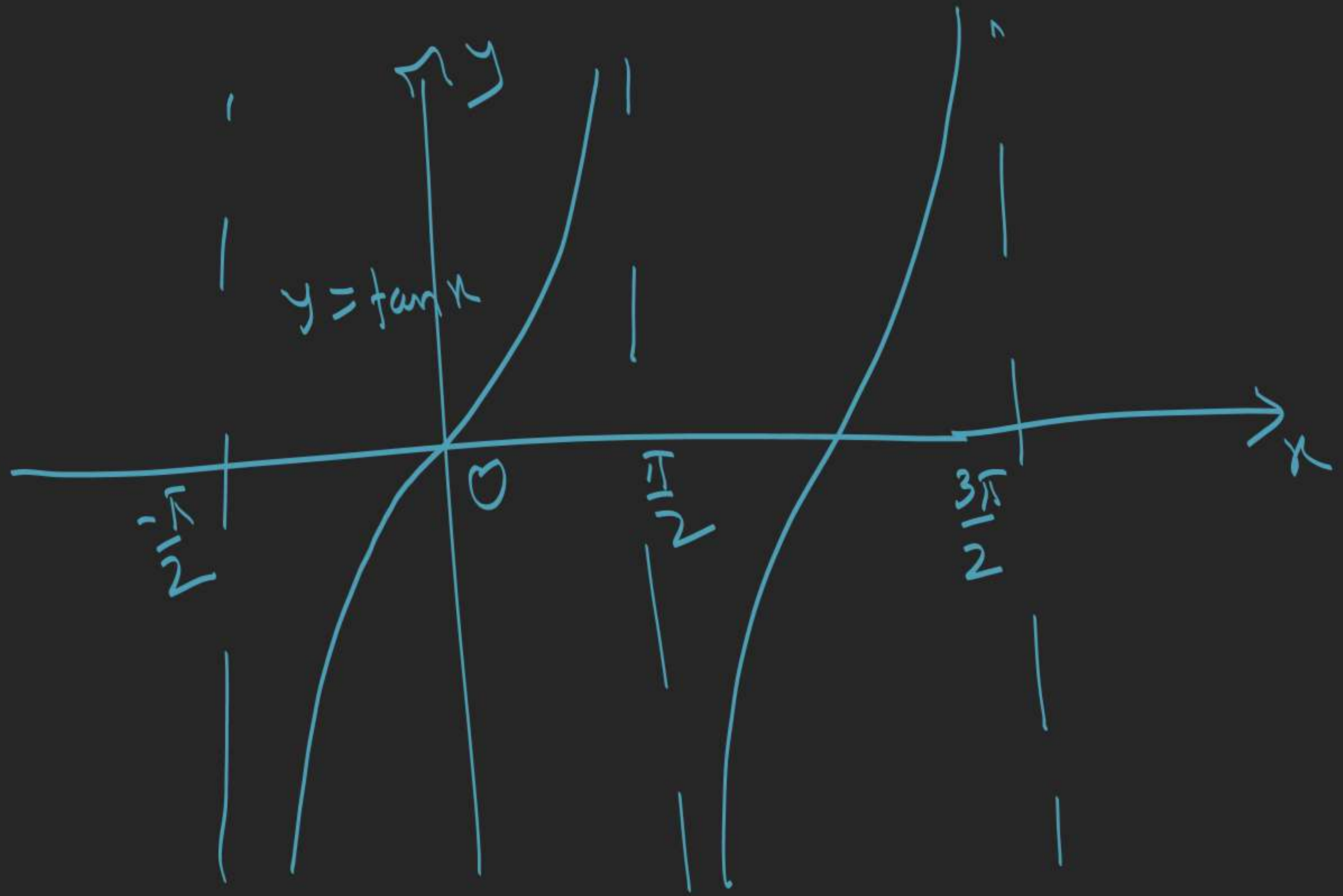

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$$\boxed{\begin{gathered} f(x) = \sec x \\ D_f = R - \left\{(2n+1)\frac{\pi}{2}\right\} \\ R_f = (-\infty,-1] \cup [1,\infty) \end{gathered}}$$

$\cos x \neq 0$

$, n \in I$.

$0 \le \tan^2 x < \infty$

$1 \le 1+\tan^2 x < \infty$

$\boxed{\sec^2 x \geq 1}$

$\sec^2 x = 1+\tan^2 x$

$\tan x \in R$

$\tan^2 x \in [0,\infty)$

$1+1$.

$t^2 \geq 1$

$(t-1)(t+1) \geq 0$

$+ \quad - \quad +$

$-1 \qquad 1$

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$$f(x) = \operatorname{cosec} x$$

$$D_f = R - \{n\pi\} \quad , n \in I \, .$$

$$R_f = (-\infty, -1] \cup [1, \infty)$$

$$\operatorname{cosec}^2 x = 1 + \cot^2 x \geqslant 1$$

$$(\operatorname{cosec} x - 1)(\operatorname{cosec} x + 1) \geqslant 0$$

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Note →

$$\sin(n\pi) = 0 \quad , n \in I$$

$$\sin\left(2n\pi + \frac{\pi}{2}\right) = 1 \quad , n \in I$$

$$\sin\left(2n\pi + \frac{3\pi}{2}\right) = -1 \quad , n \in I$$

$$\cos\left((2n+1)\frac{\pi}{2}\right) = 0$$

$$\cos(2n\pi) = 1 \quad , n \in I$$

$$\cos((2n+1)\pi) = -1$$

$$\tan(n\pi) = 0$$

$n \in I$

$$\tan\left((2n+1)\frac{\pi}{2}\right) = \text{not defined}$$

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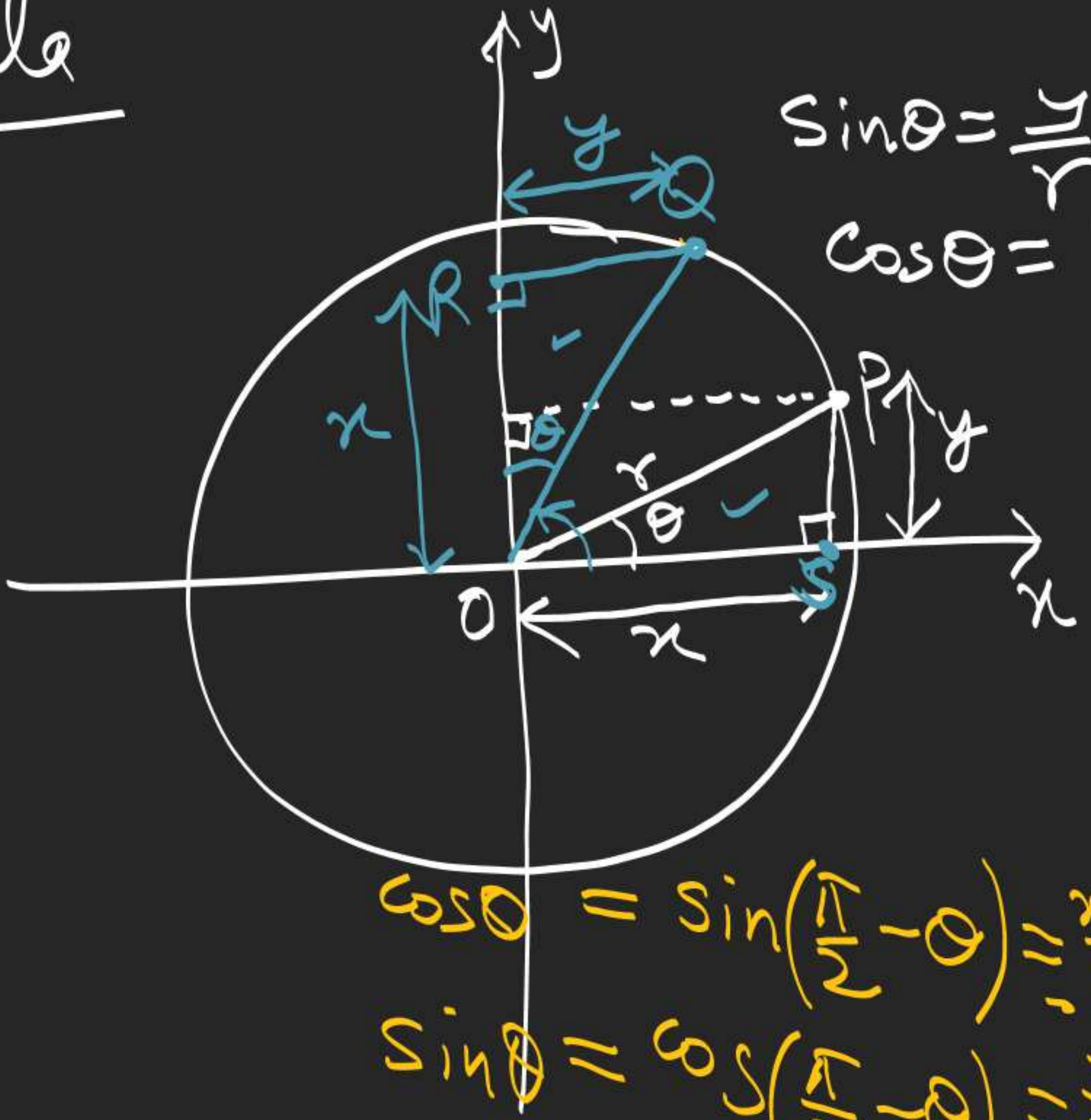
Reduction formula

$$\sin\left(\frac{\pi}{2}-\theta\right) = \cos\theta$$

$$\cos\left(\frac{\pi}{2}-\theta\right) = \sin\theta$$

$$\tan\left(\frac{\pi}{2}-\theta\right) = \cot\theta$$



$$\sin\theta = \frac{y}{r}$$

$$\cos\theta = \frac{x}{r}$$

$$\cos\theta = \sin\left(\frac{\pi}{2}-\theta\right) = \frac{x}{r} =$$

$$\sin\theta = \cos\left(\frac{\pi}{2}-\theta\right) = \frac{y}{r}.$$

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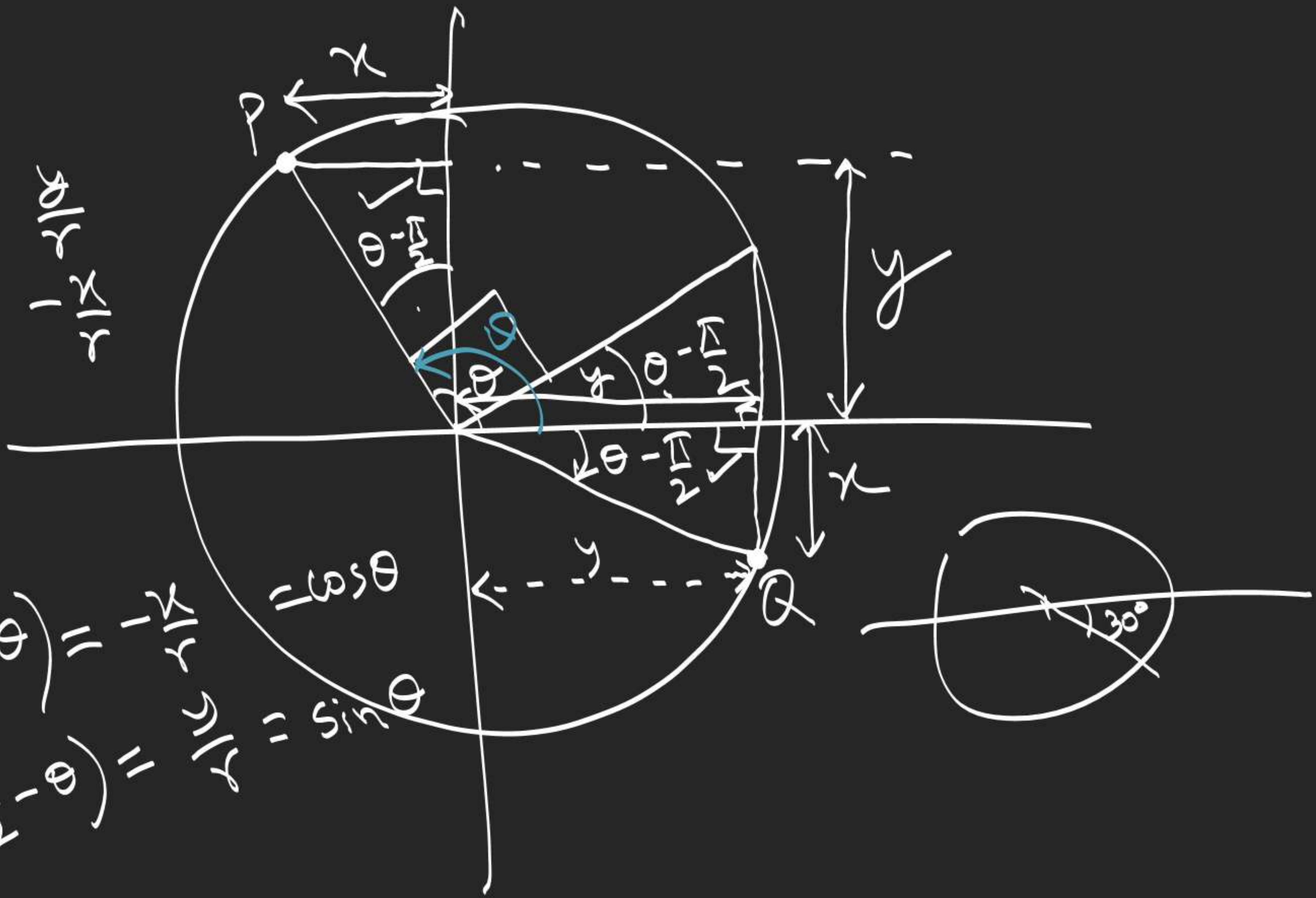
$$\sin\theta = \frac{y}{r}$$

$$\cos\theta = -\frac{x}{r}$$



$$\sin\left(\frac{\pi}{2}-\theta\right) = -\frac{x}{r} = \cos\theta$$

$$\cos\left(\frac{\pi}{2}-\theta\right) = \frac{y}{r} = \sin\theta$$

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$$\sin\left(\frac{\pi}{2}+\theta\right) = \cos\theta$$

$$\cos\left(\frac{\pi}{2}+\theta\right) = -\sin\theta$$

$$\tan\left(\frac{\pi}{2}+\theta\right) = -\cot\theta$$

$$\sin(\pi-\theta) = \sin\theta$$

$$\cos(\pi-\theta) = -\cos\theta$$

$$\tan(\pi-\theta) = -\tan\theta$$

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

$$\cos(\pi+\theta) = -\cos\theta$$

$$\tan(\pi+\theta) = \tan\theta$$

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$$\sin\left(\frac{3\pi}{2}-\theta\right) = -\cos\theta$$

$$\cos\left(\frac{3\pi}{2}-\theta\right) = -\sin\theta$$

$$\tan\left(\frac{3\pi}{2}-\theta\right) = \cot\theta$$

$$\sin\left(\frac{3\pi}{2}+\theta\right) = -\cos\theta$$

$$\cos\left(\frac{3\pi}{2}+\theta\right) = \sin\theta$$

$$\tan\left(\frac{3\pi}{2}+\theta\right) = -\cot\theta$$

$$\sin(-\theta) = \sin(2\pi-\theta) = -\sin\theta$$

$$\cos(-\theta) = \cos(2\pi-\theta) = \cos\theta$$

$$\tan(-\theta) = \tan(2\pi-\theta) = -\tan\theta$$

$$\sin(2\pi+\theta) = \sin\theta$$

$$\cos(2\pi+\theta) = \cos\theta$$

$$\tan(2\pi+\theta) = \tan\theta$$

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