4.3 TRIGONOMÉTRIE INVERSE

cours 25

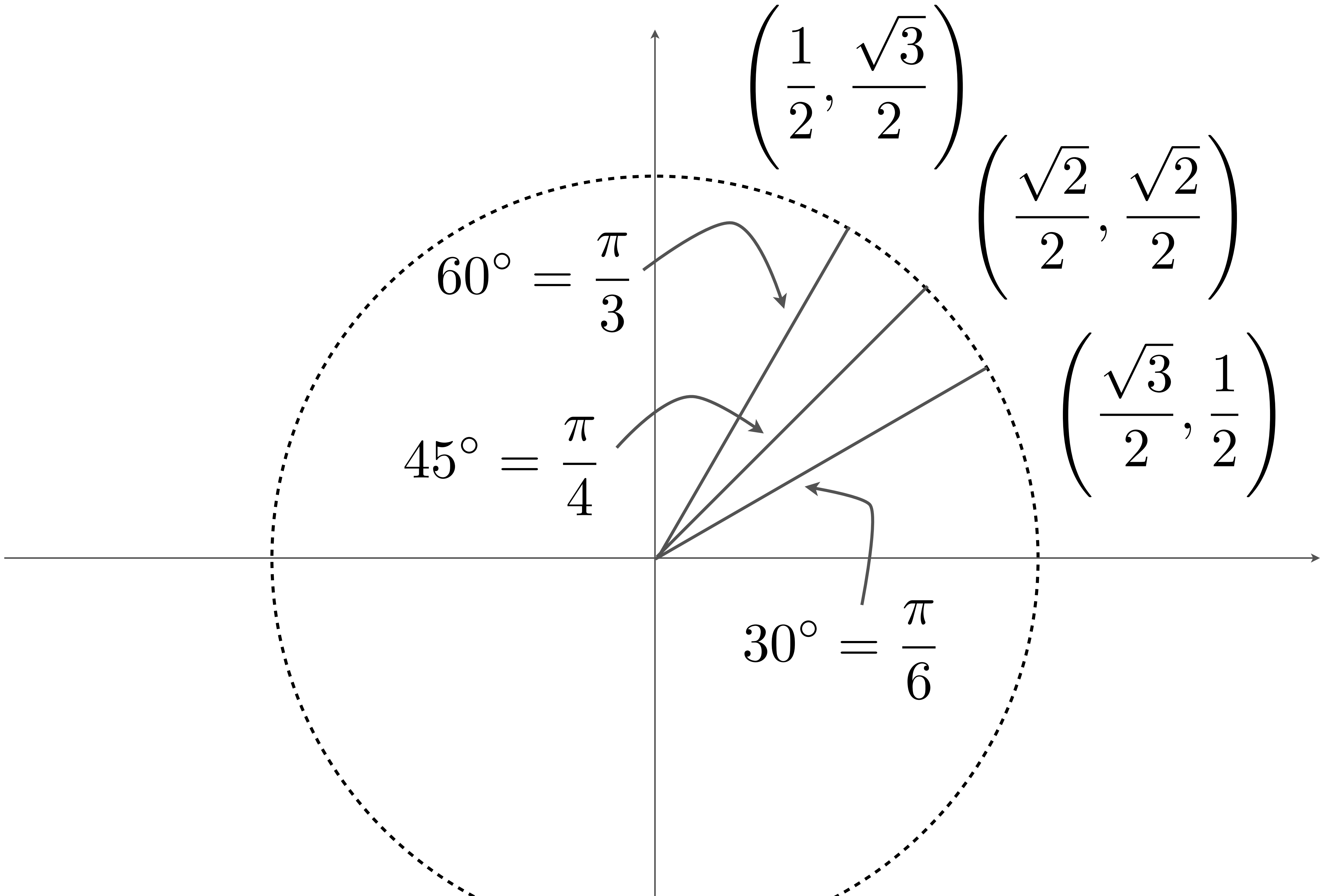
Au dernier cours, nous avons vu

Au dernier cours, nous avons vu

SOH CAH TOA

Au dernier cours, nous avons vu

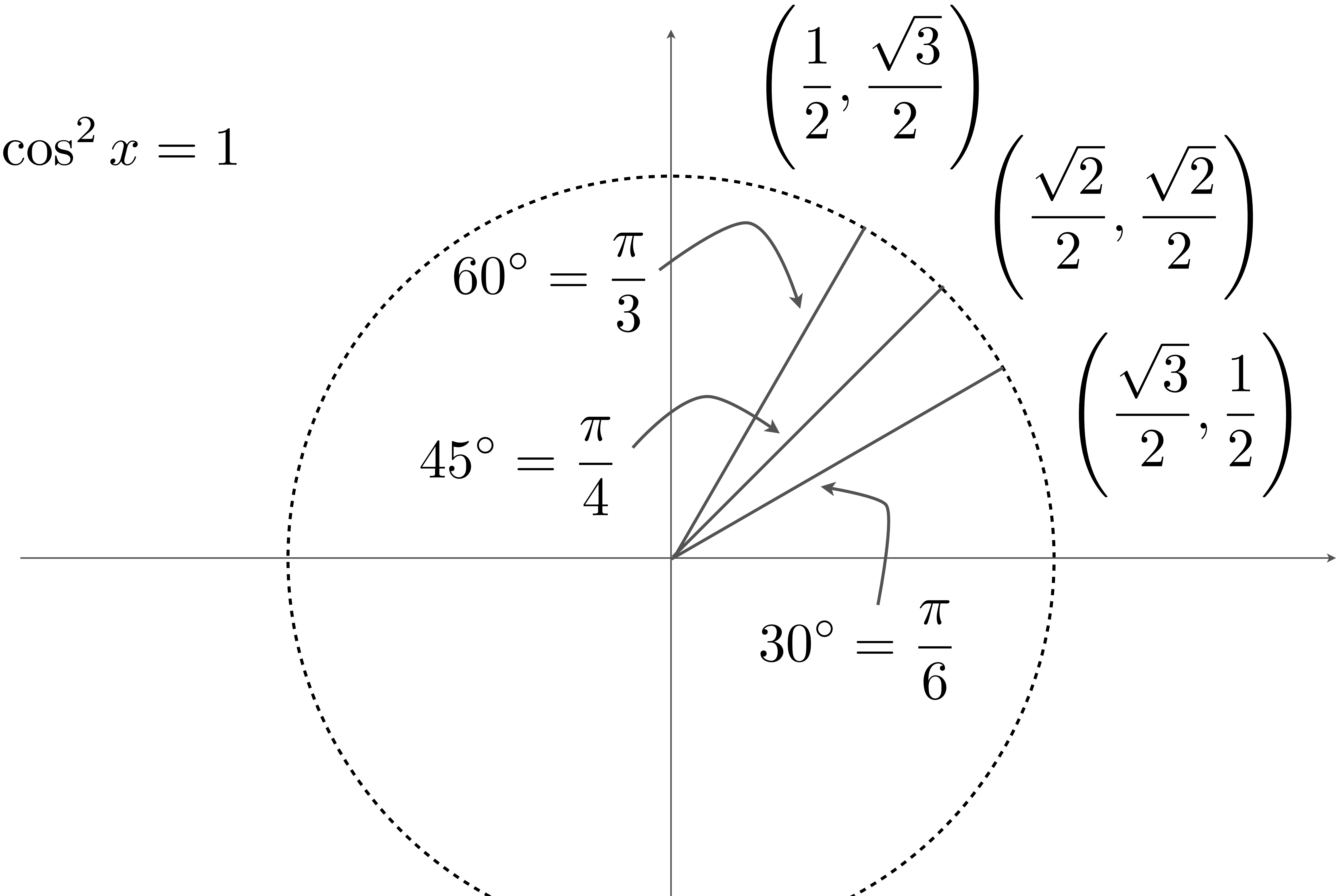
SOH CAH TOA



Au dernier cours, nous avons vu

SOH CAH TOA

$$\sin^2 x + \cos^2 x = 1$$

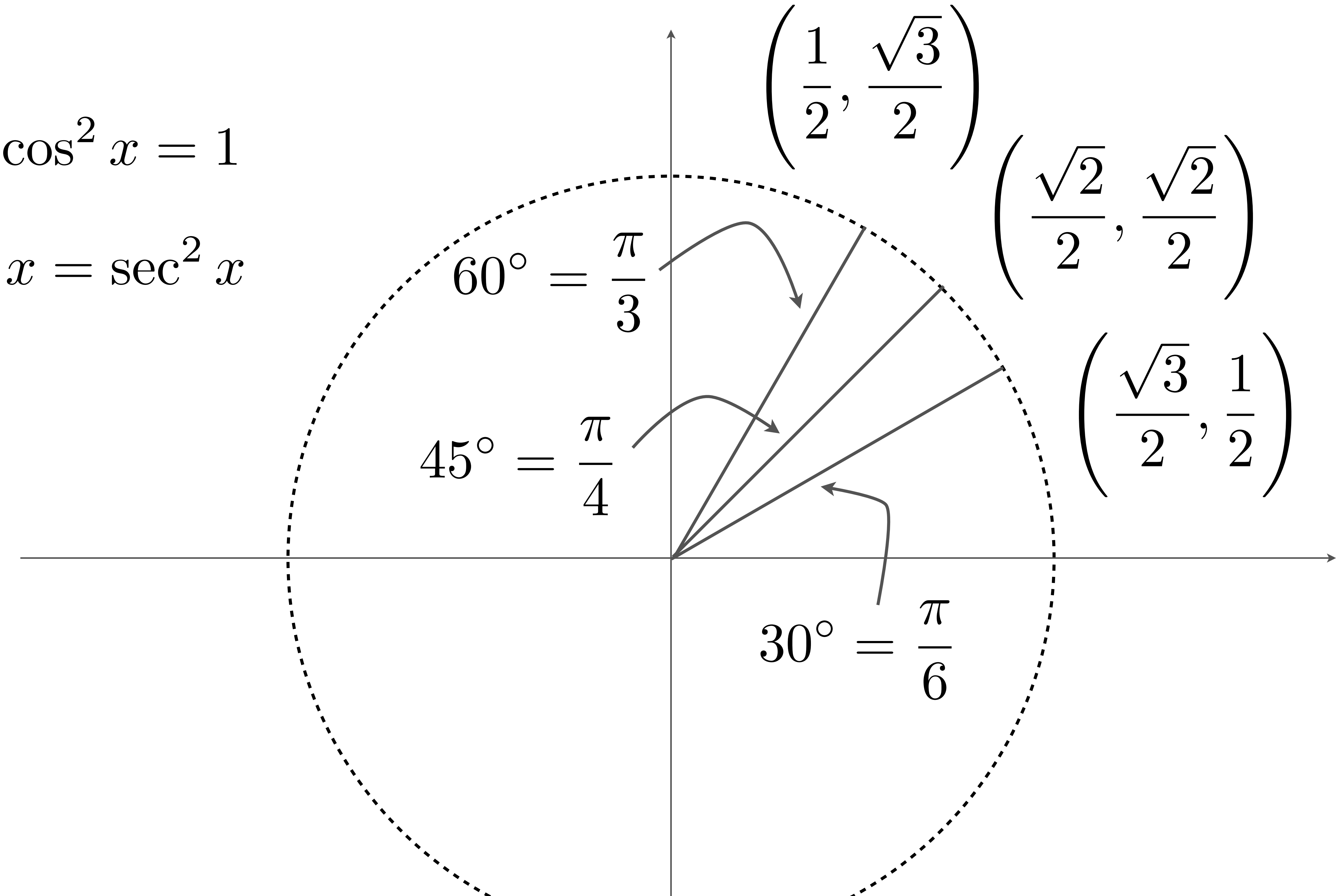


Au dernier cours, nous avons vu

SOH CAH TOA

$$\sin^2 x + \cos^2 x = 1$$

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



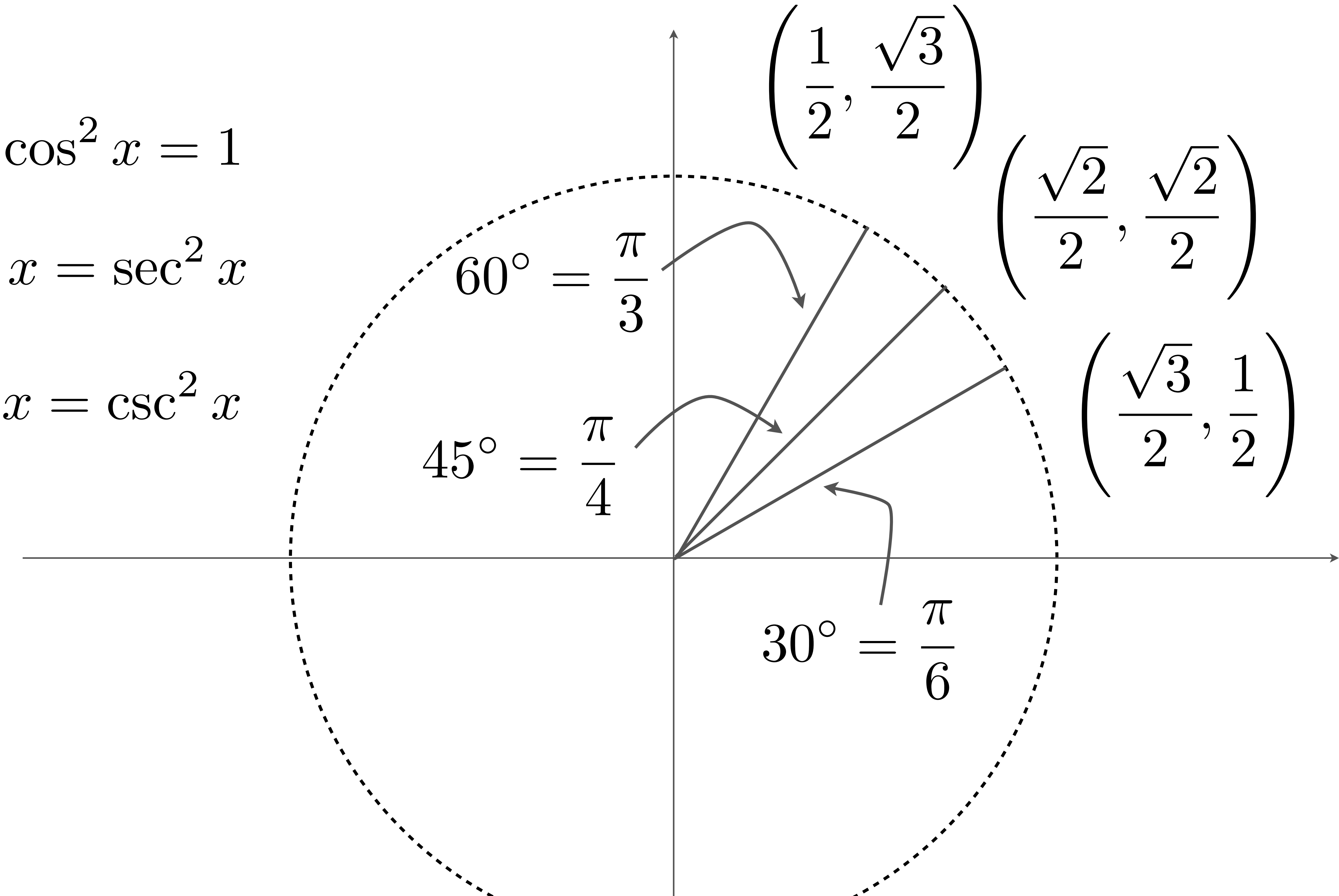
Au dernier cours, nous avons vu

SOH CAH TOA

$$\sin^2 x + \cos^2 x = 1$$

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

$$1 + \cot^2 x = \csc^2 x$$



Au dernier cours, nous avons vu

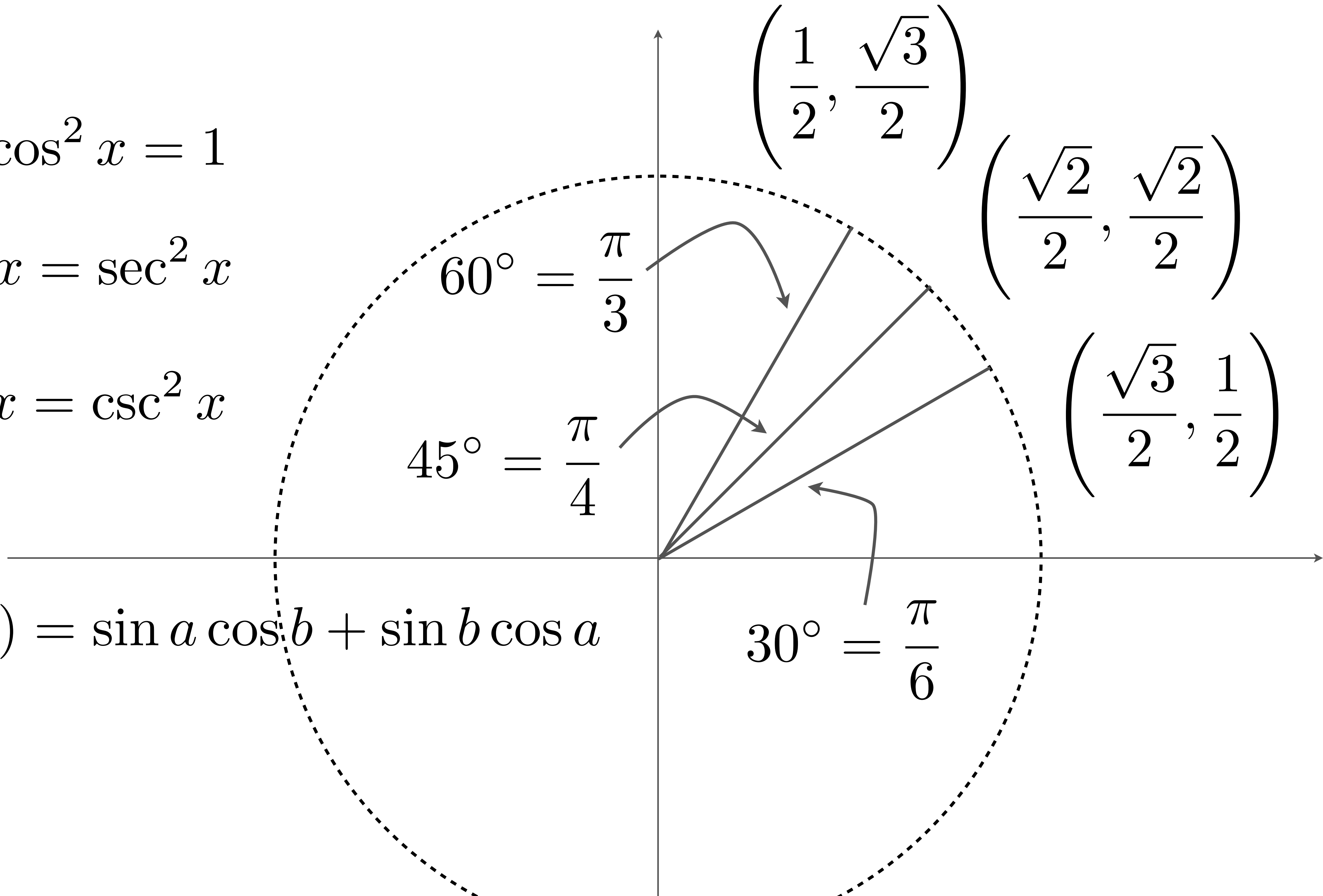
SOH CAH TOA

$$\sin^2 x + \cos^2 x = 1$$

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

$$1 + \cot^2 x = \csc^2 x$$

$$\sin(a+b) = \sin a \cos b + \sin b \cos a$$



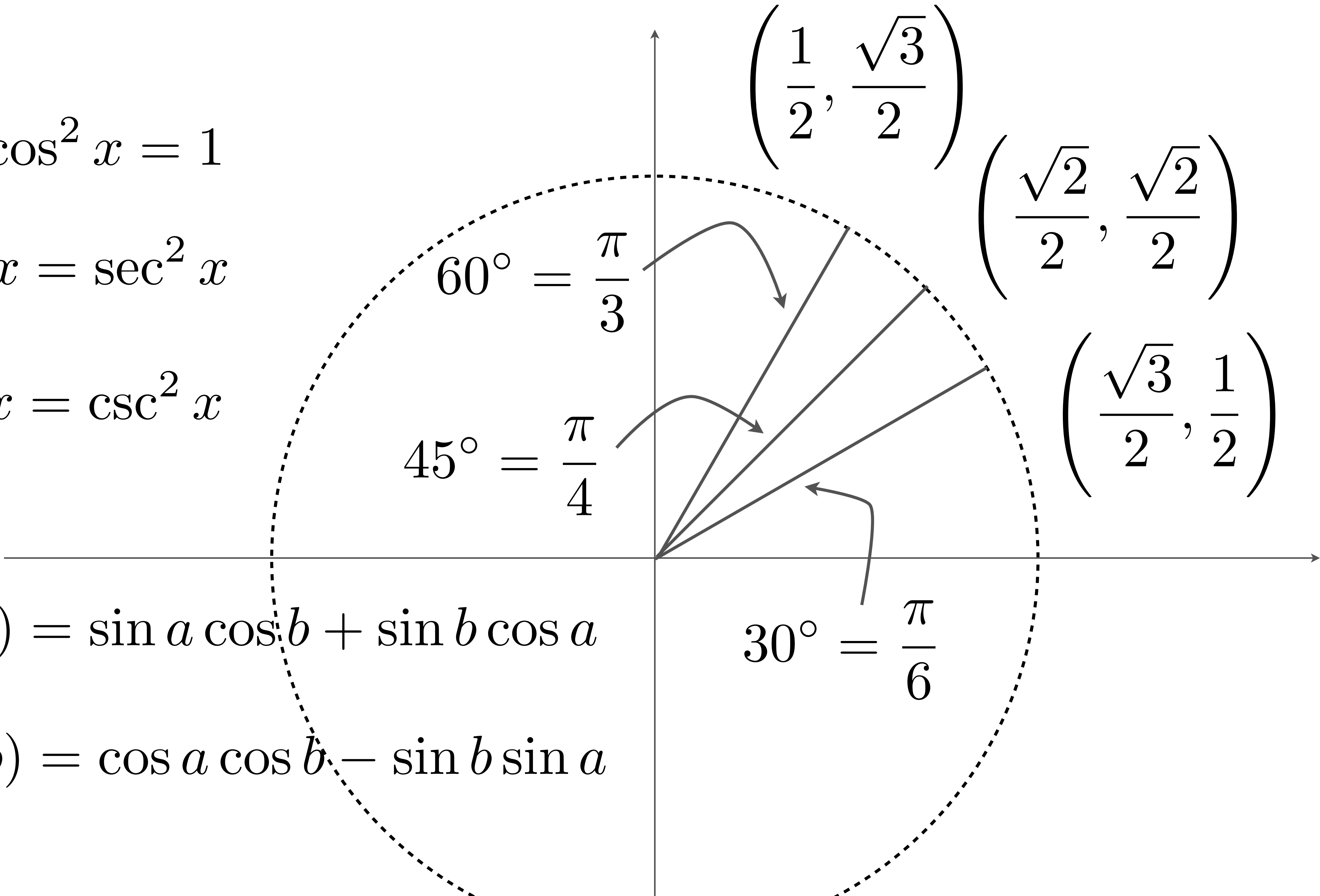
Au dernier cours, nous avons vu

SOH CAH TOA

$$\sin^2 x + \cos^2 x = 1$$

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

$$1 + \cot^2 x = \csc^2 x$$



$$\sin(a+b) = \sin a \cos b + \sin b \cos a$$

$$\cos(a+b) = \cos a \cos b - \sin b \sin a$$

Au dernier cours, nous avons vu

Au dernier cours, nous avons vu

$$(\sin x)' = \cos x$$

Au dernier cours, nous avons vu

$$(\sin x)' = \cos x \qquad\qquad (\cos x)' = -\sin x$$

Au dernier cours, nous avons vu

$$(\sin x)' = \cos x$$

$$(\cos x)' = -\sin x$$

$$(\tan x)' = \sec^2 x$$

Au dernier cours, nous avons vu

$$(\sin x)' = \cos x$$

$$(\cos x)' = -\sin x$$

$$(\tan x)' = \sec^2 x$$

$$(\cot x)' = -\csc^2 x$$

Au dernier cours, nous avons vu

$$(\sin x)' = \cos x$$

$$(\cos x)' = -\sin x$$

$$(\tan x)' = \sec^2 x$$

$$(\cot x)' = -\csc^2 x$$

$$(\sec x)' = \sec x \tan x$$

Au dernier cours, nous avons vu

$$(\sin x)' = \cos x \qquad (\cos x)' = -\sin x$$

$$(\tan x)' = \sec^2 x \qquad (\cot x)' = -\csc^2 x$$

$$(\sec x)' = \sec x \tan x \qquad (\csc x)' = -\csc x \cot x$$

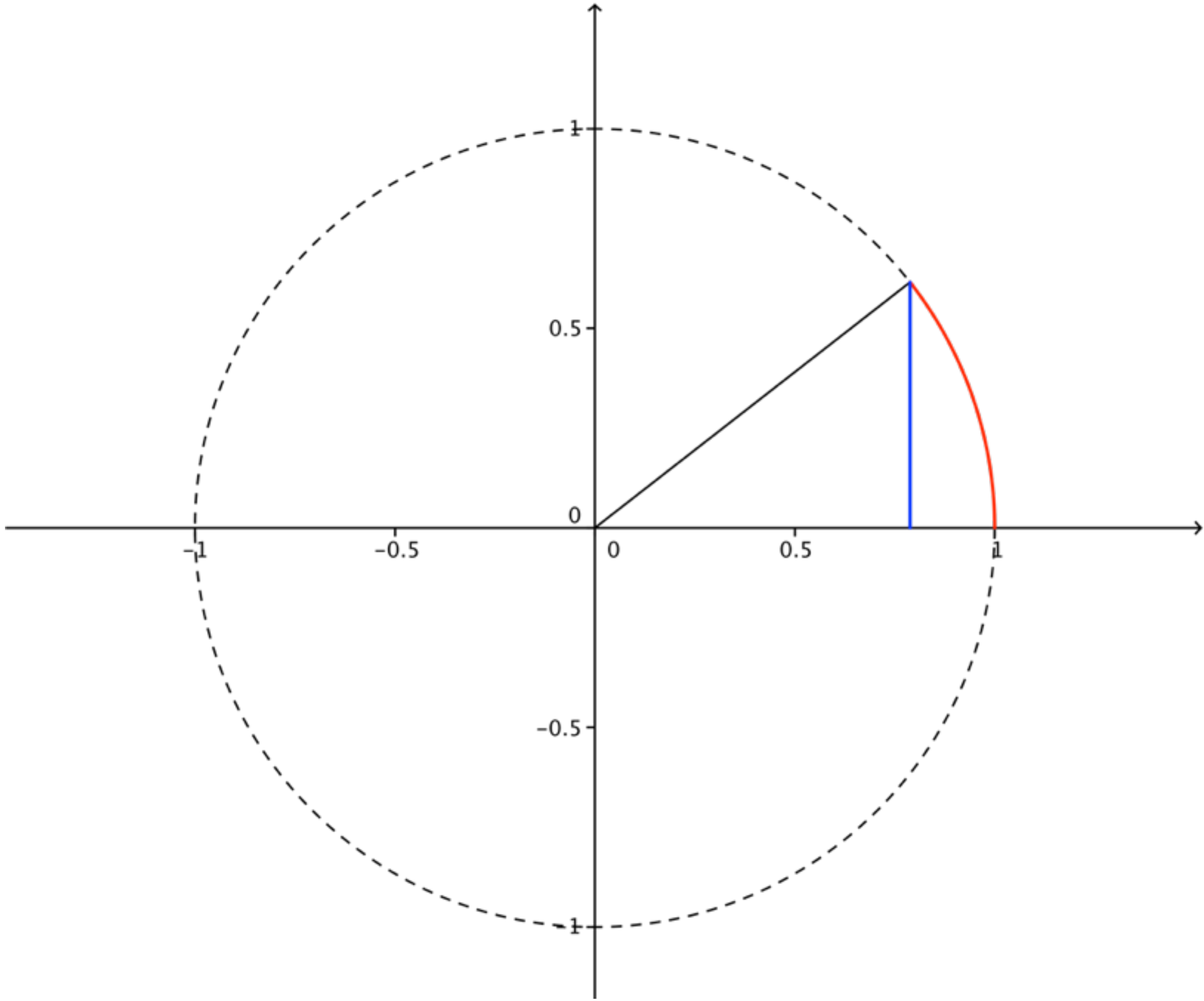
Aujourd’hui, nous allons voir

Aujourd’hui, nous allons voir

- ✓ Fonctions trigonométriques inverses

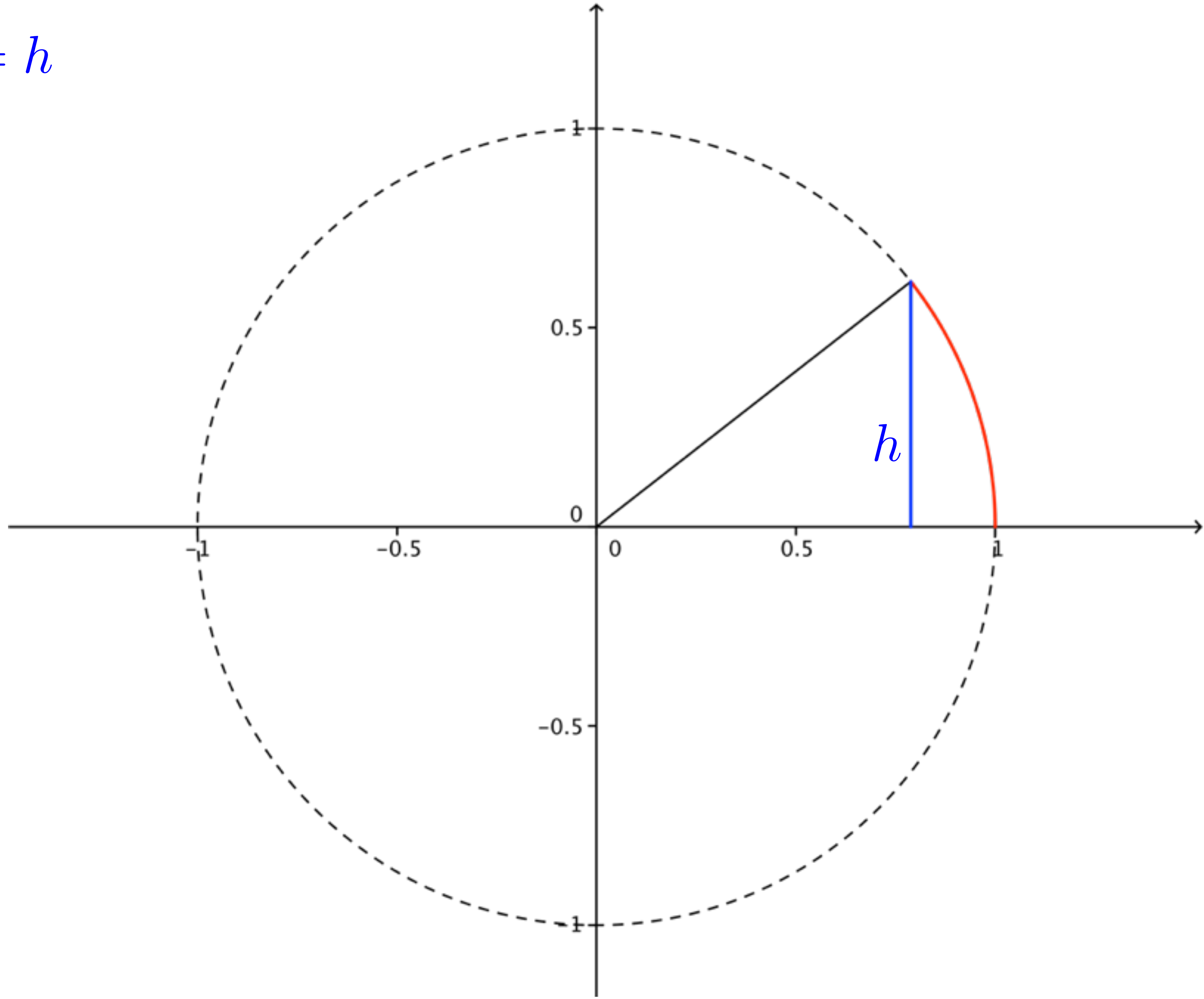
Aujourd'hui, nous allons voir

- ✓ Fonctions trigonométriques inverses
- ✓ Leurs dérivées



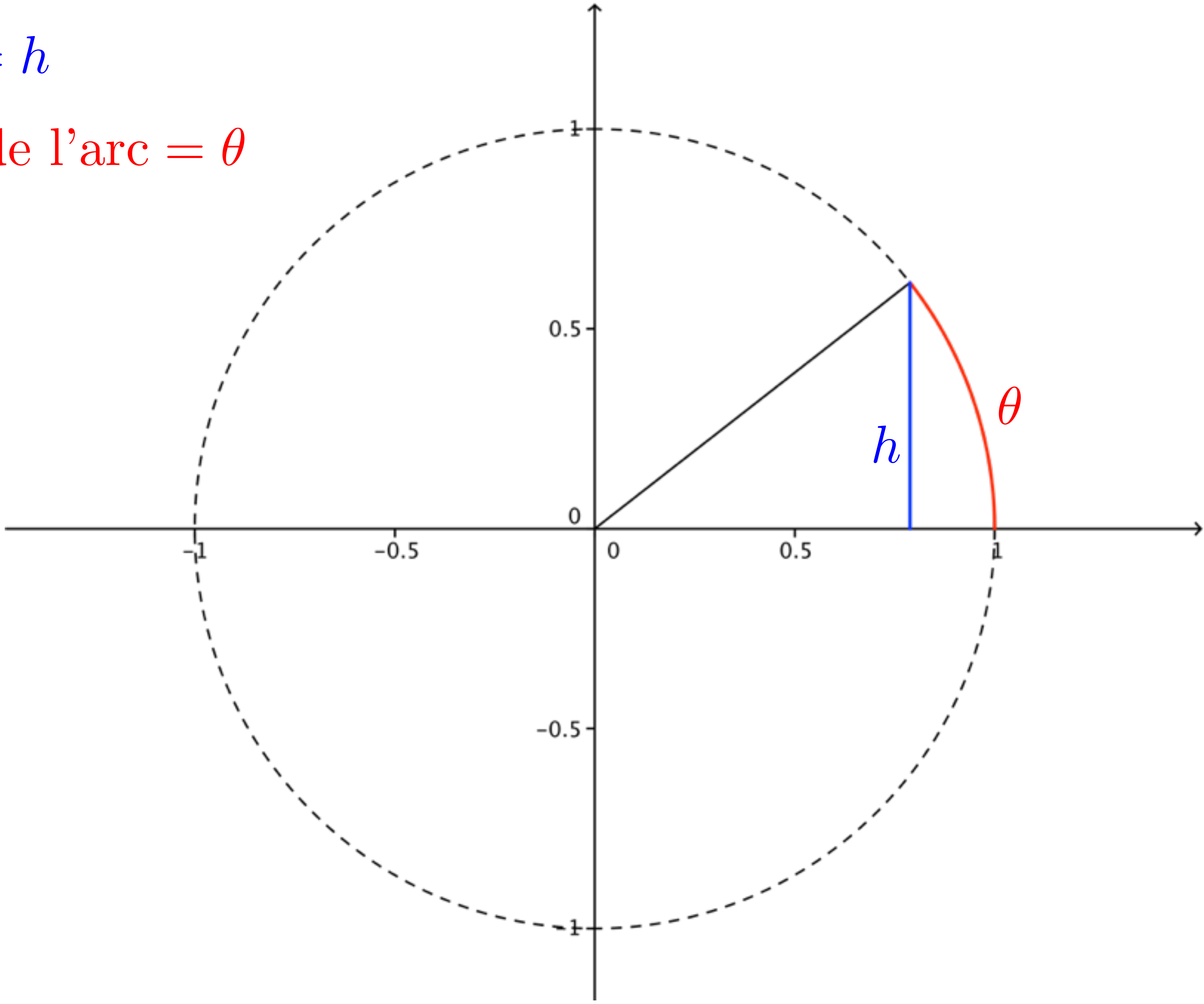
1
0.5
0
−0.5
−1
−1
−0.5
0
0.5
1

hauteur = h



hauteur $= h$

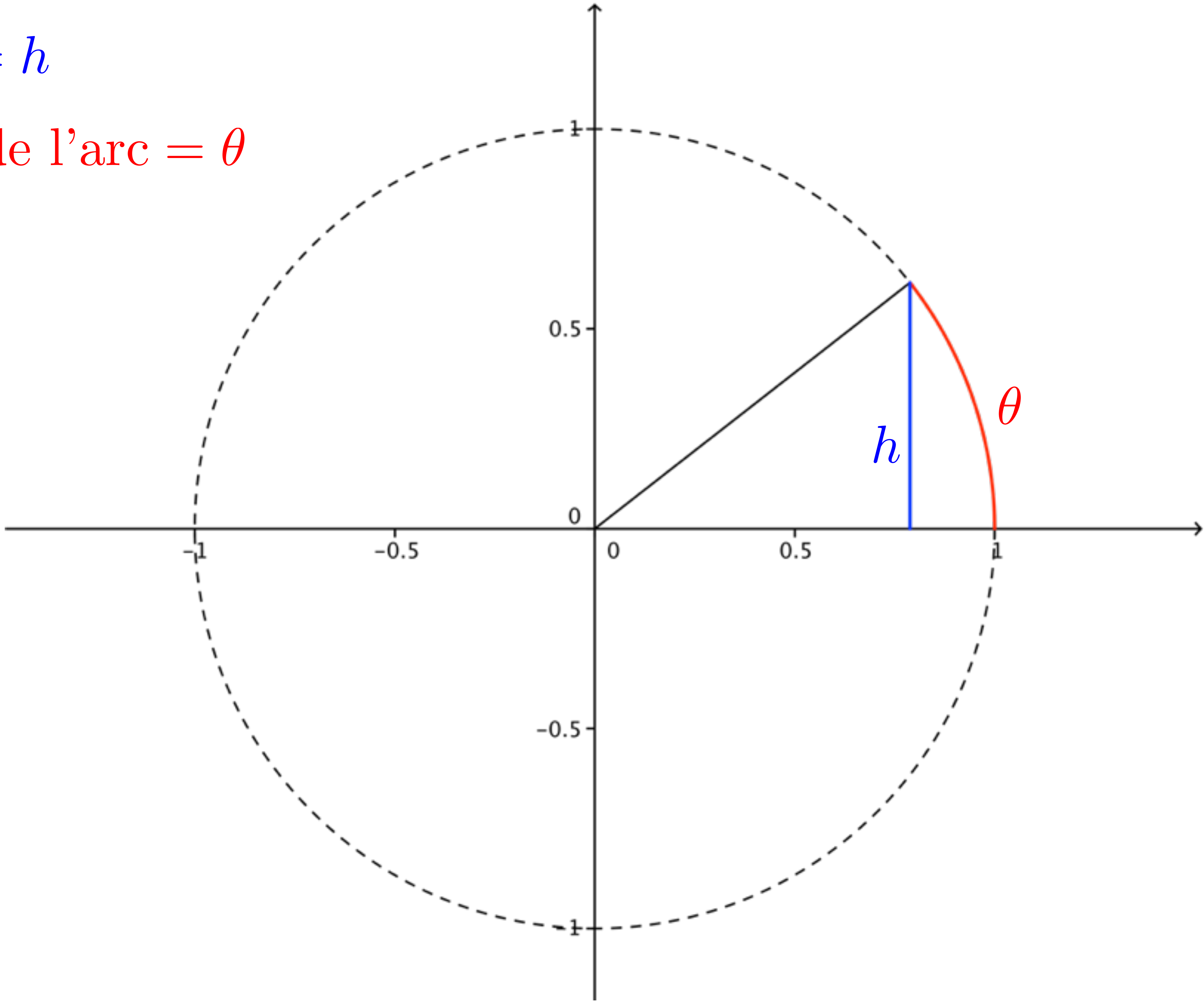
longueur de l'arc $= \theta$



hauteur $= h$

longueur de l'arc $= \theta$

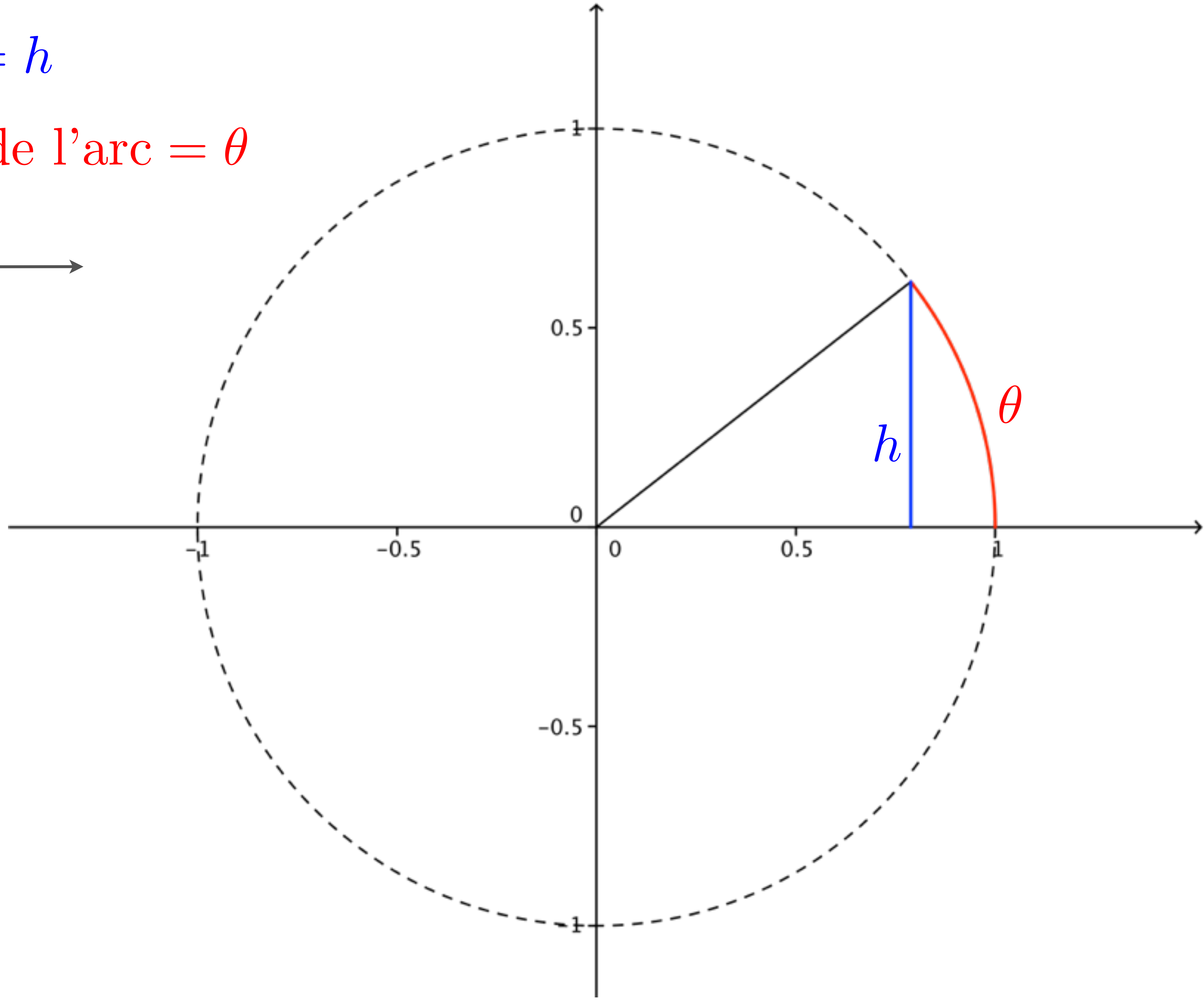
θ



hauteur $= h$

longueur de l'arc $= \theta$

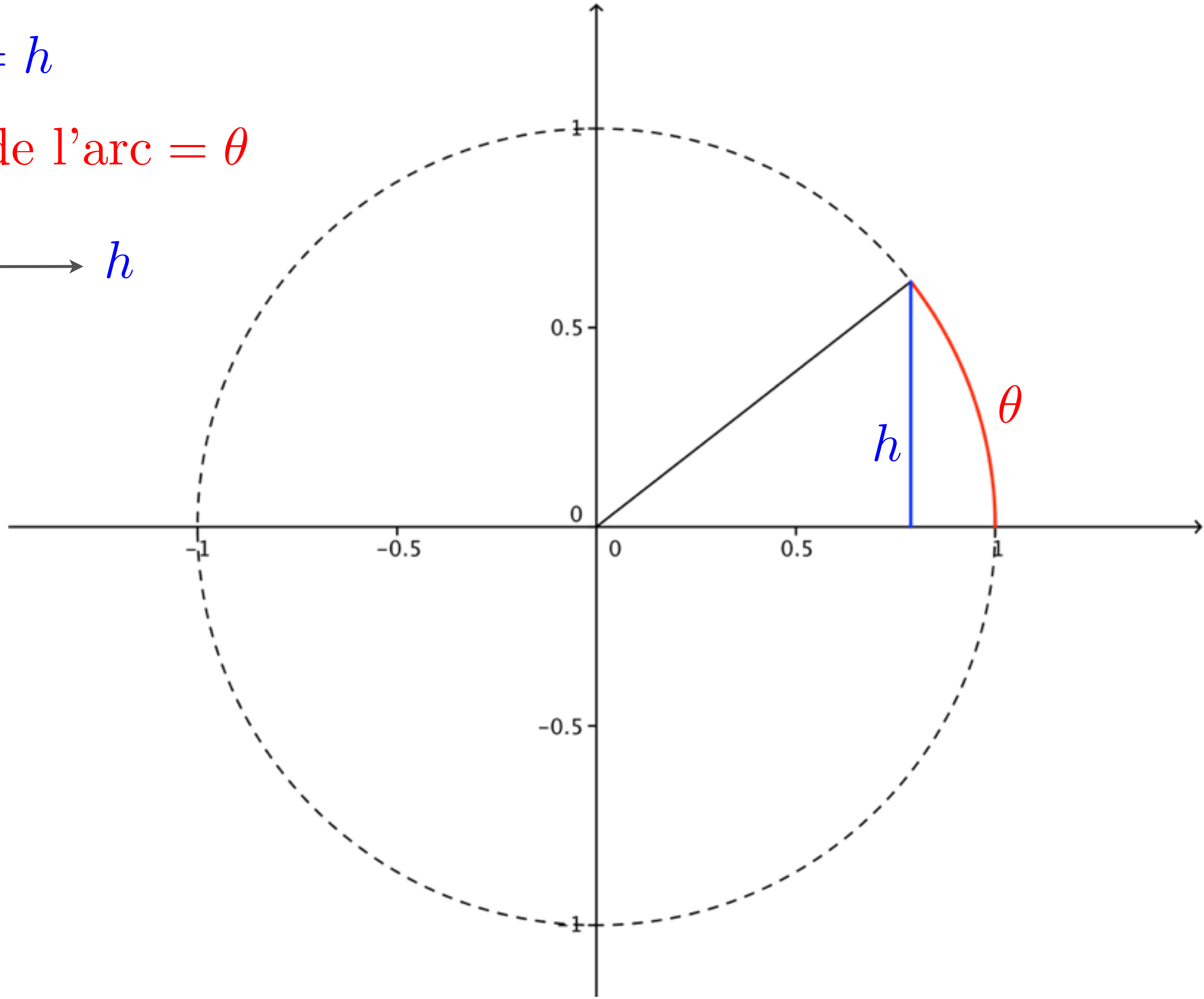
$$\theta \xrightarrow{\ \sin\ }$$



$\text{hauteur} = h$

$\text{longueur de l'arc} = \theta$

$$\theta \xrightarrow{\sin} h$$

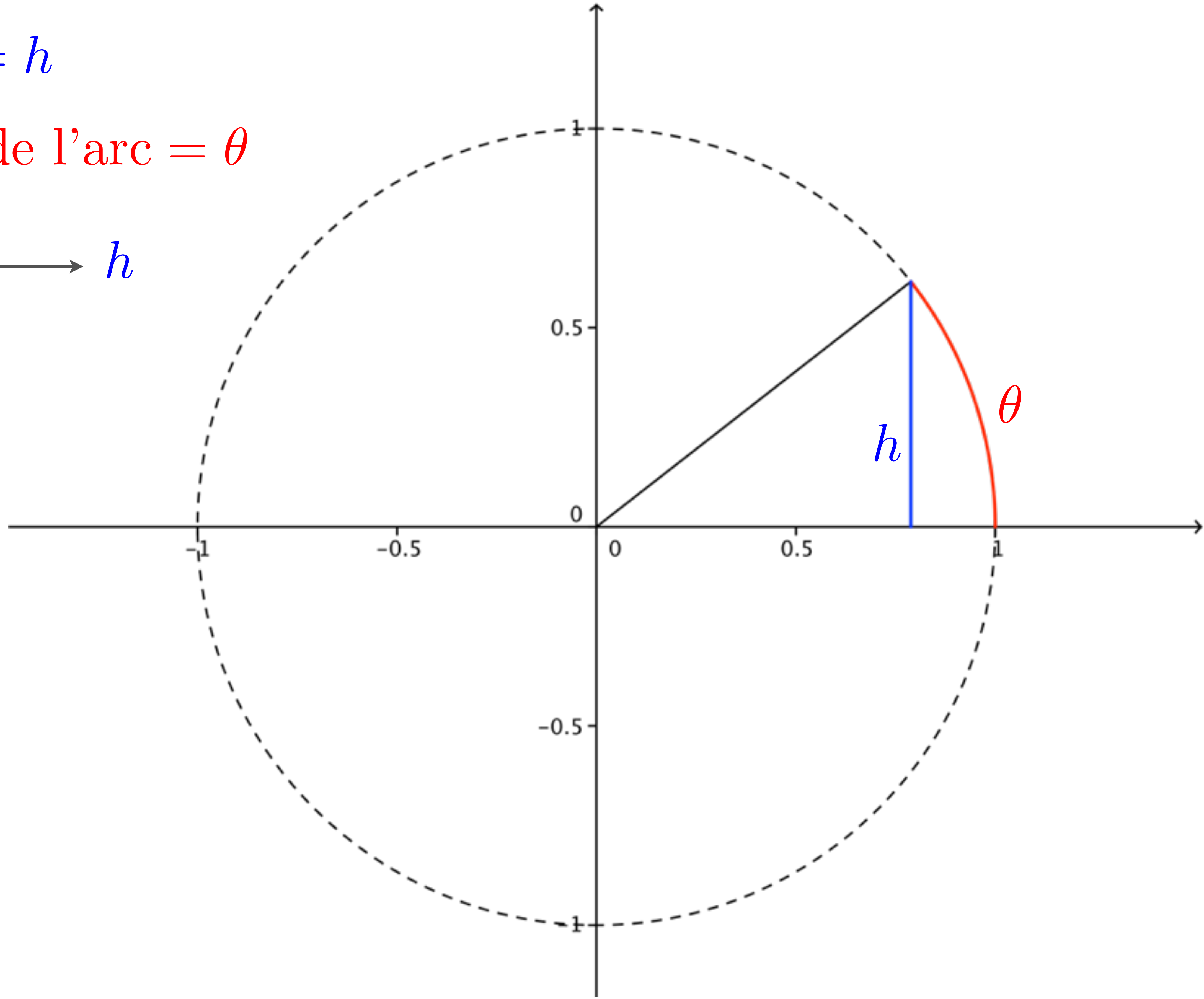


hauteur $= h$

longueur de l'arc $= \theta$

$$\theta \xrightarrow{\quad \sin \quad} h$$

h

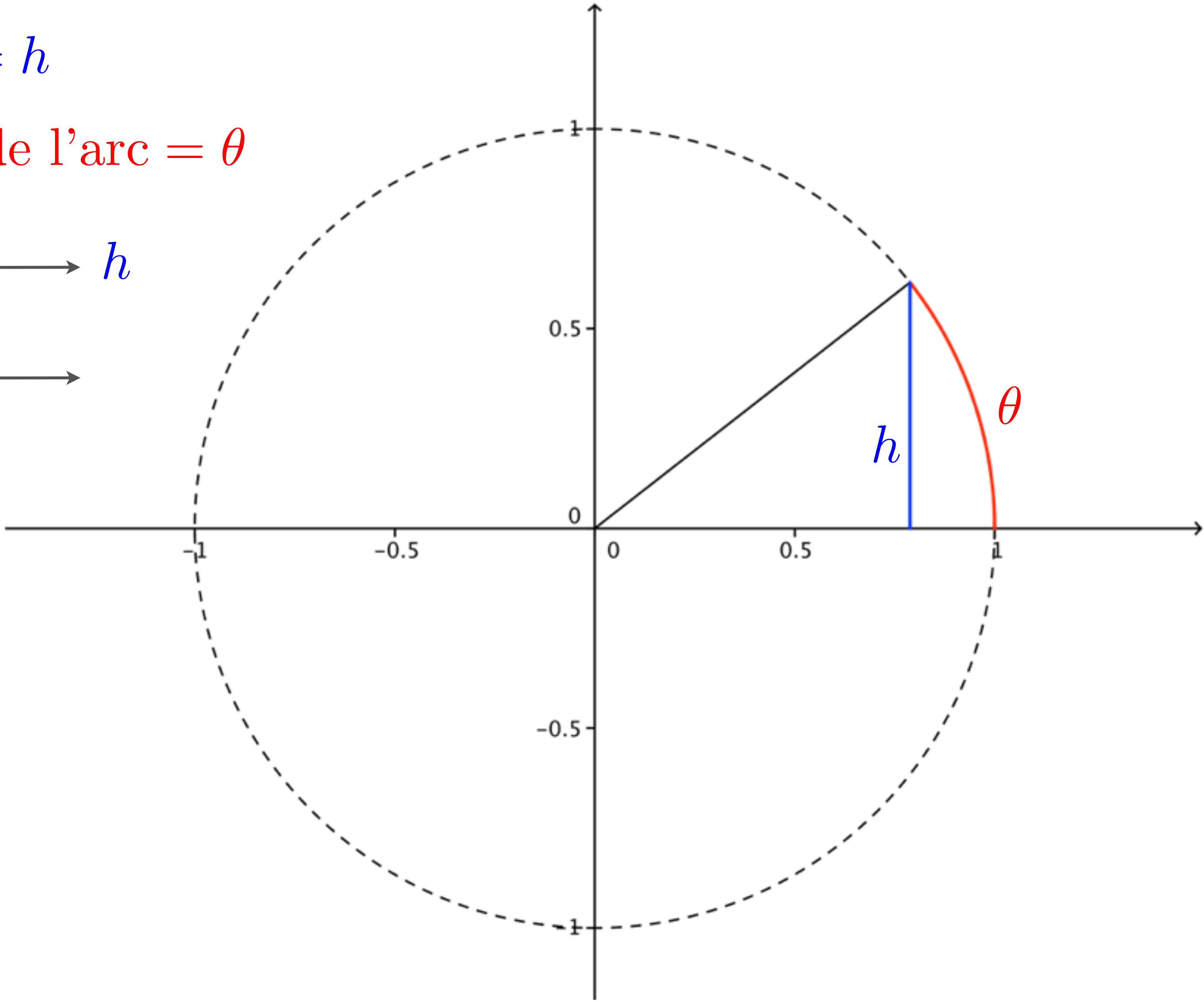


hauteur $= h$

longueur de l'arc $= \theta$

$$\theta \xrightarrow{\sin} h$$

$$h \xrightarrow{\arcsin}$$

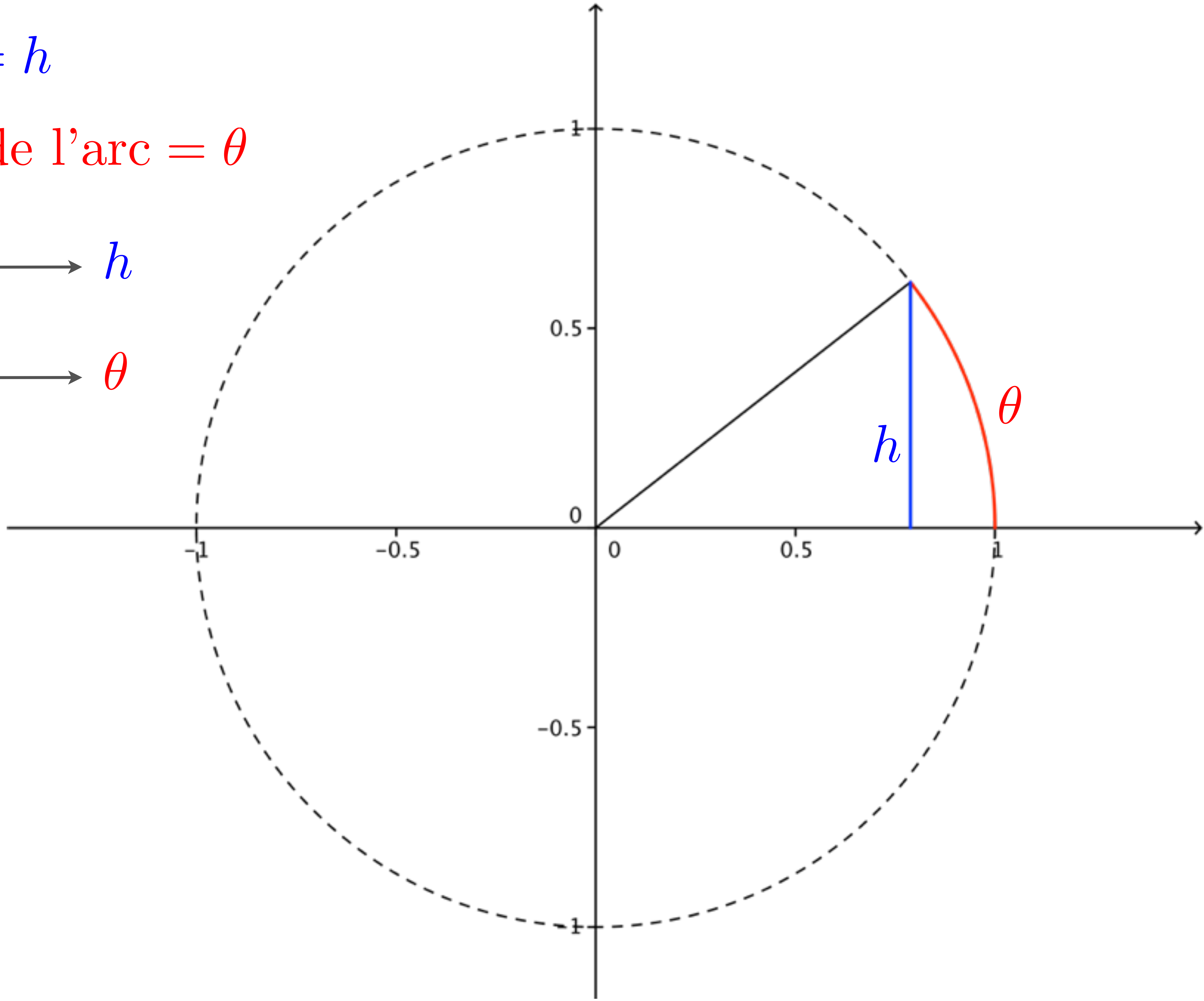


hauteur $= h$

longueur de l'arc $= \theta$

$$\theta \xrightarrow{\quad \sin \quad} h$$

$$h \xrightarrow{\quad \arcsin \quad} \theta$$

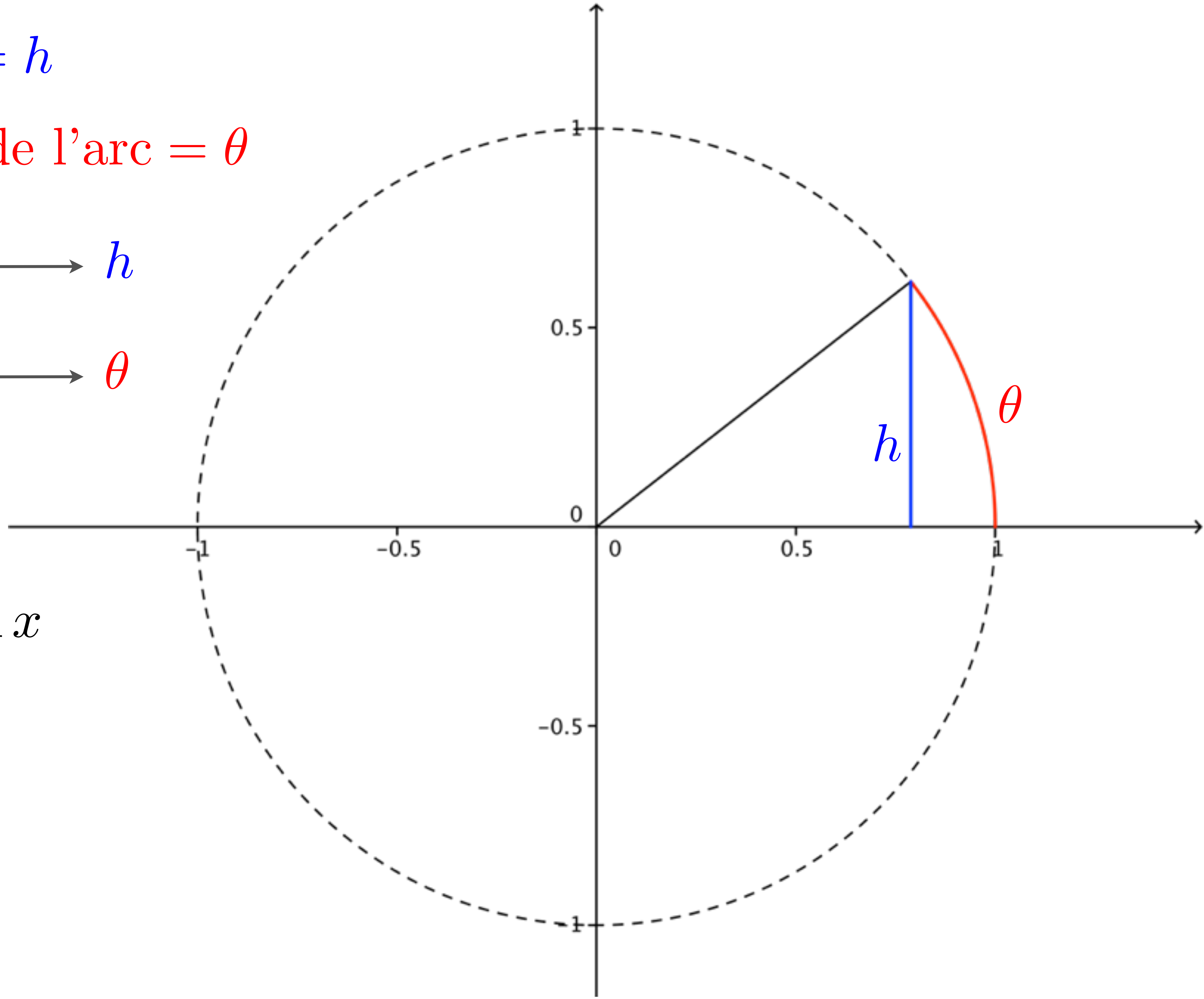


$\text{hauteur} = h$

$\text{longueur de l'arc} = \theta$

$$\theta \xrightarrow{\quad \sin \quad} h$$

$$h \xrightarrow{\quad \arcsin \quad} \theta$$



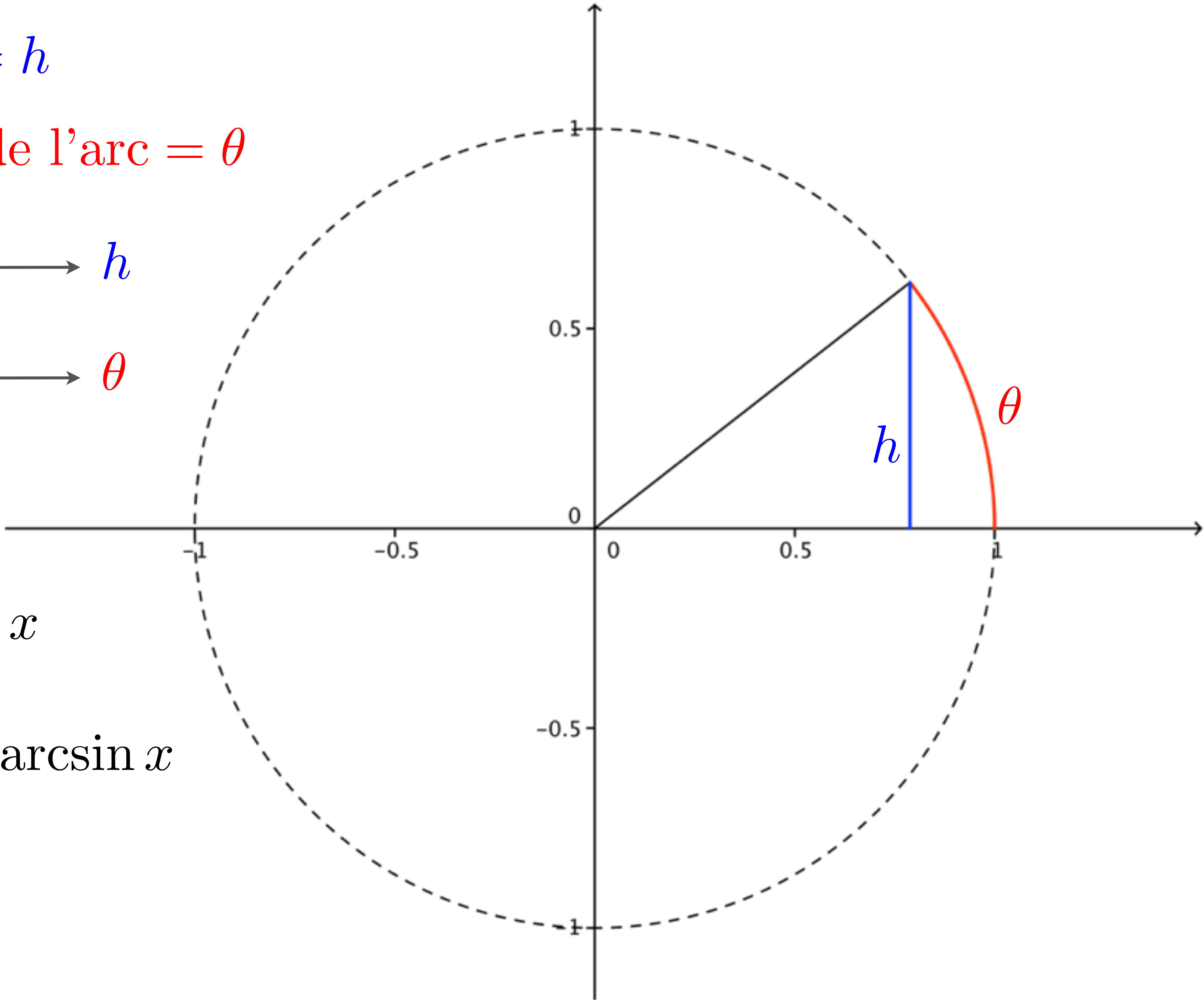
$$f(x) = \sin x$$

hauteur $= h$

longueur de l'arc $= \theta$

$$\theta \xrightarrow{\sin} h$$

$$h \xrightarrow{\arcsin} \theta$$



$$f(x) = \sin x$$

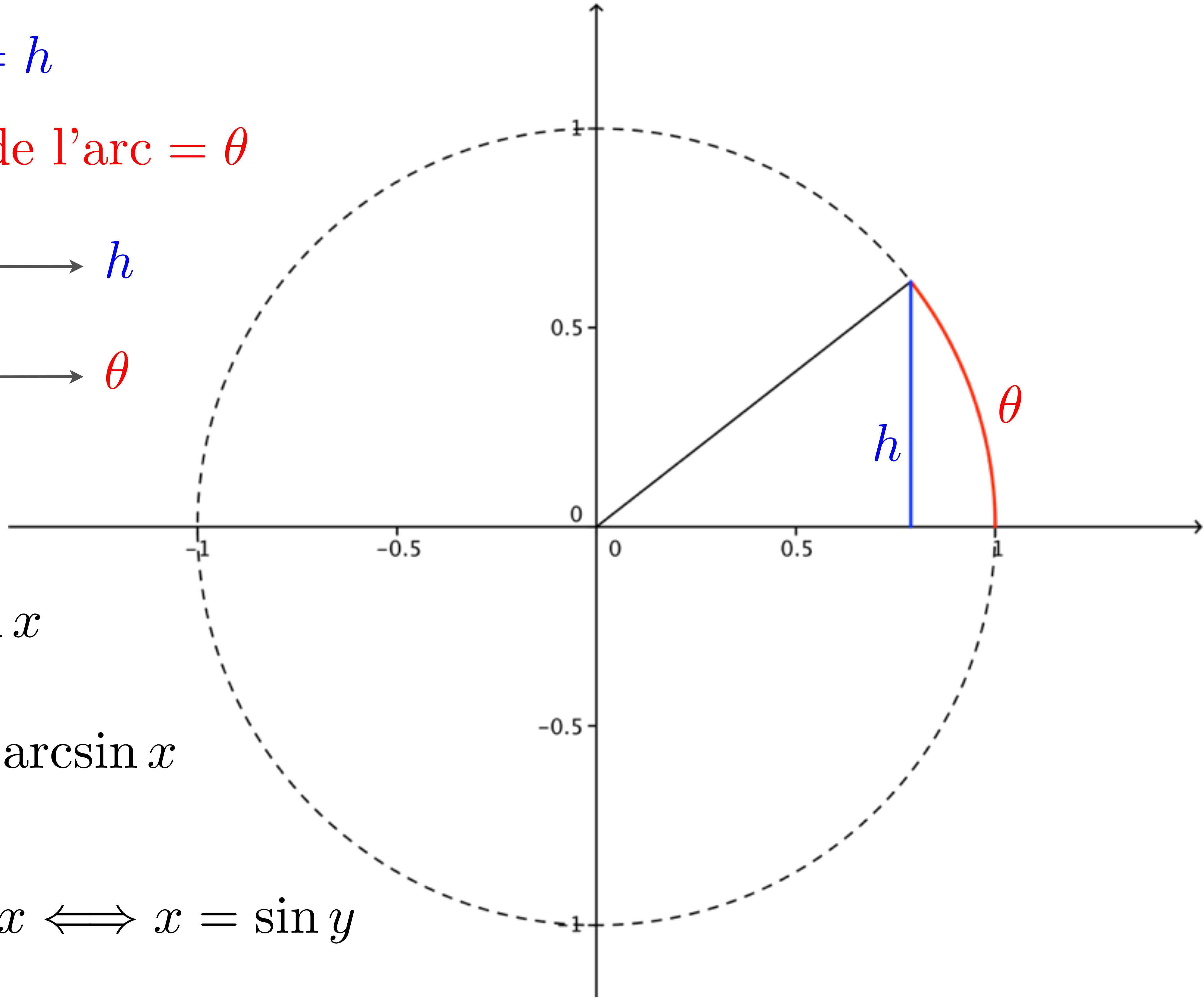
$$f^{-1}(x) = \arcsin x$$

hauteur $= h$

longueur de l'arc $= \theta$

$$\theta \xrightarrow{\sin} h$$

$$h \xrightarrow{\arcsin} \theta$$



$$f(x) = \sin x$$

$$f^{-1}(x) = \arcsin x$$

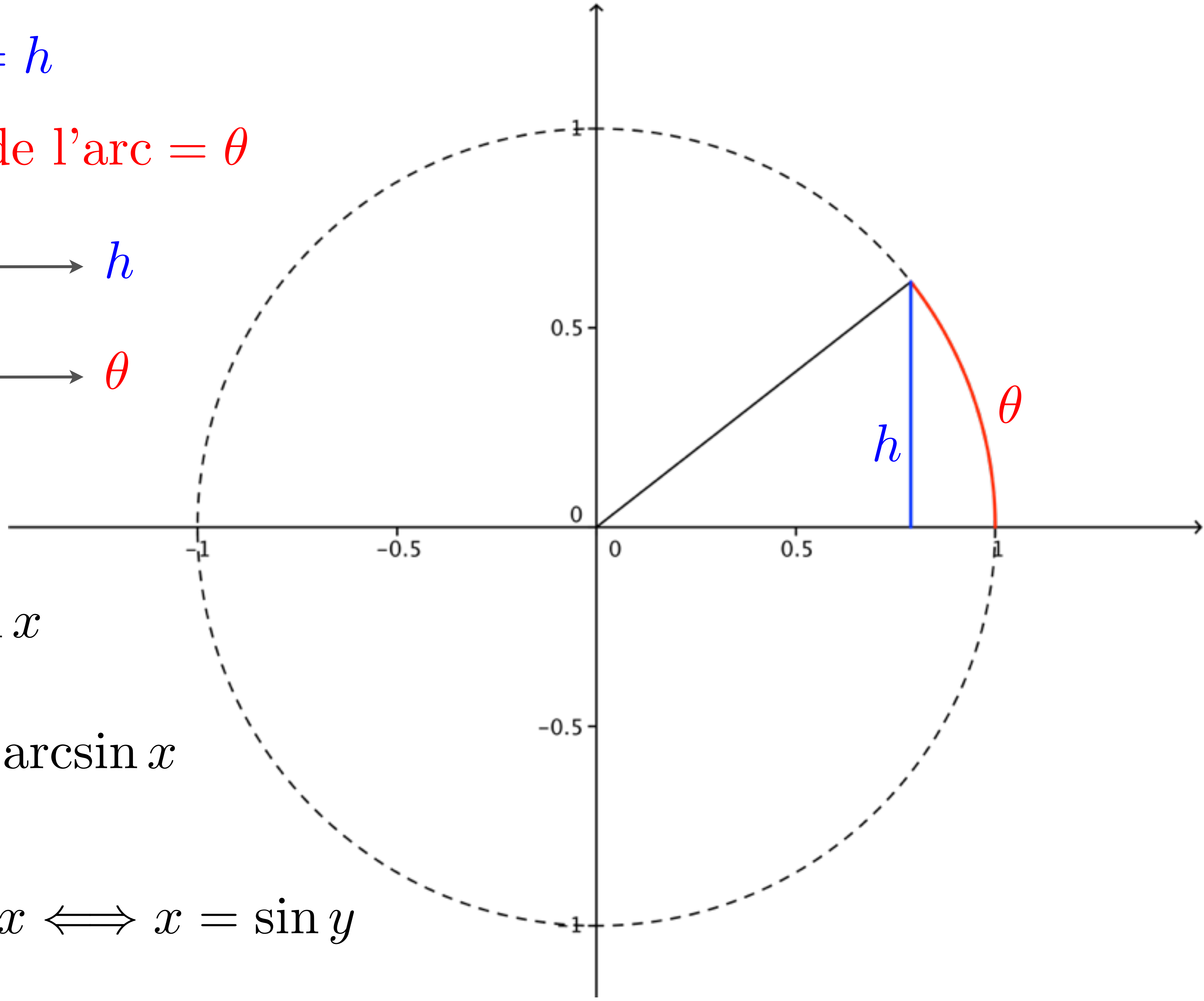
$$y = \arcsin x \iff x = \sin y$$

hauteur $= h$

longueur de l'arc $= \theta$

$$\theta \xrightarrow{\quad \sin \quad} h$$

$$h \xrightarrow{\quad \arcsin \quad} \theta$$



$$f(x) = \sin x$$

$$f^{-1}(x) = \arcsin x$$

$$y = \arcsin x \iff x = \sin y$$

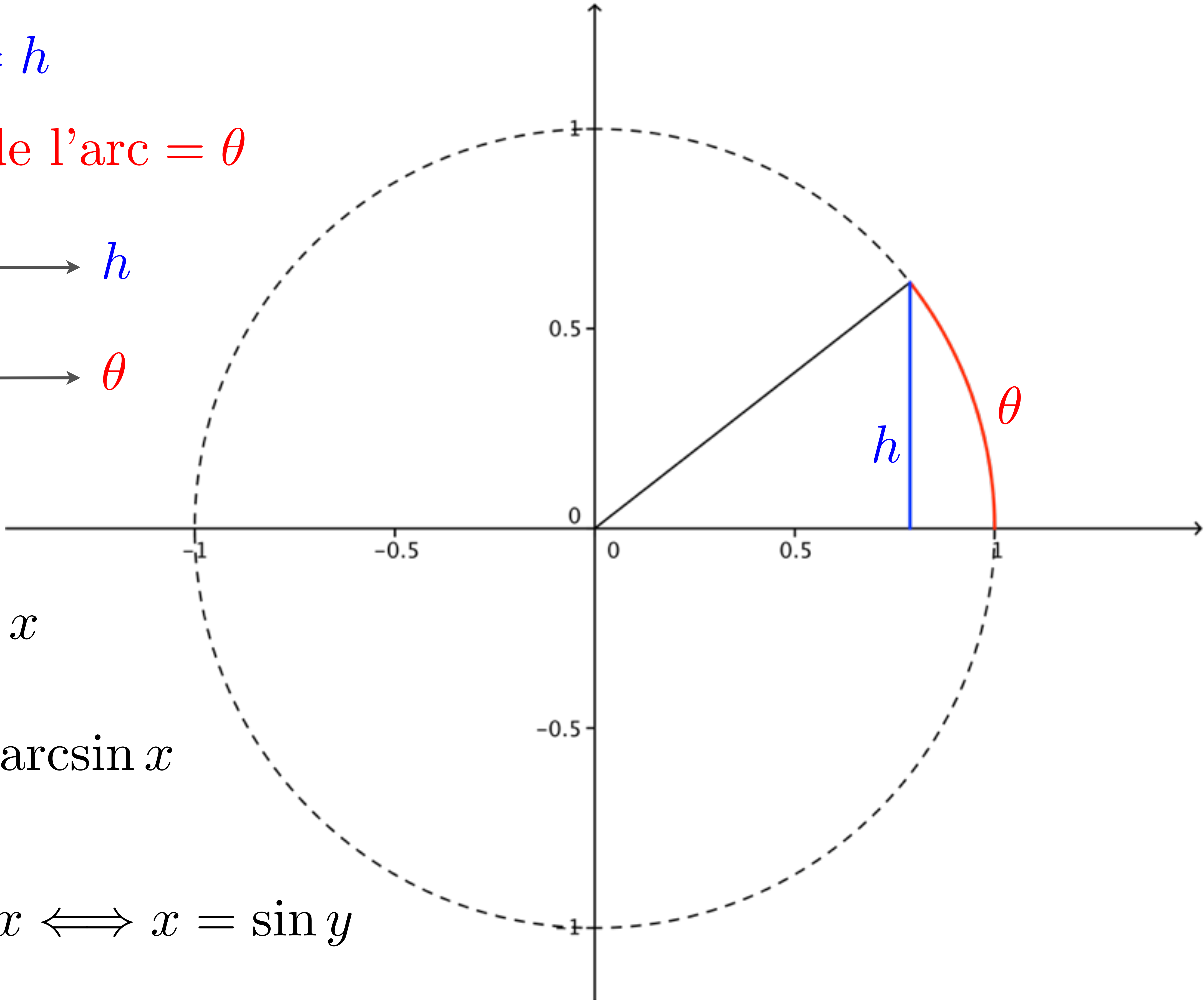
$$\sin(\arcsin x)$$

$\text{hauteur} = h$

$\text{longueur de l'arc} = \theta$

$$\theta \xrightarrow{\quad \sin \quad} h$$

$$h \xrightarrow{\quad \arcsin \quad} \theta$$



$$f(x) = \sin x$$

$$f^{-1}(x) = \arcsin x$$

$$y = \arcsin x \iff x = \sin y$$

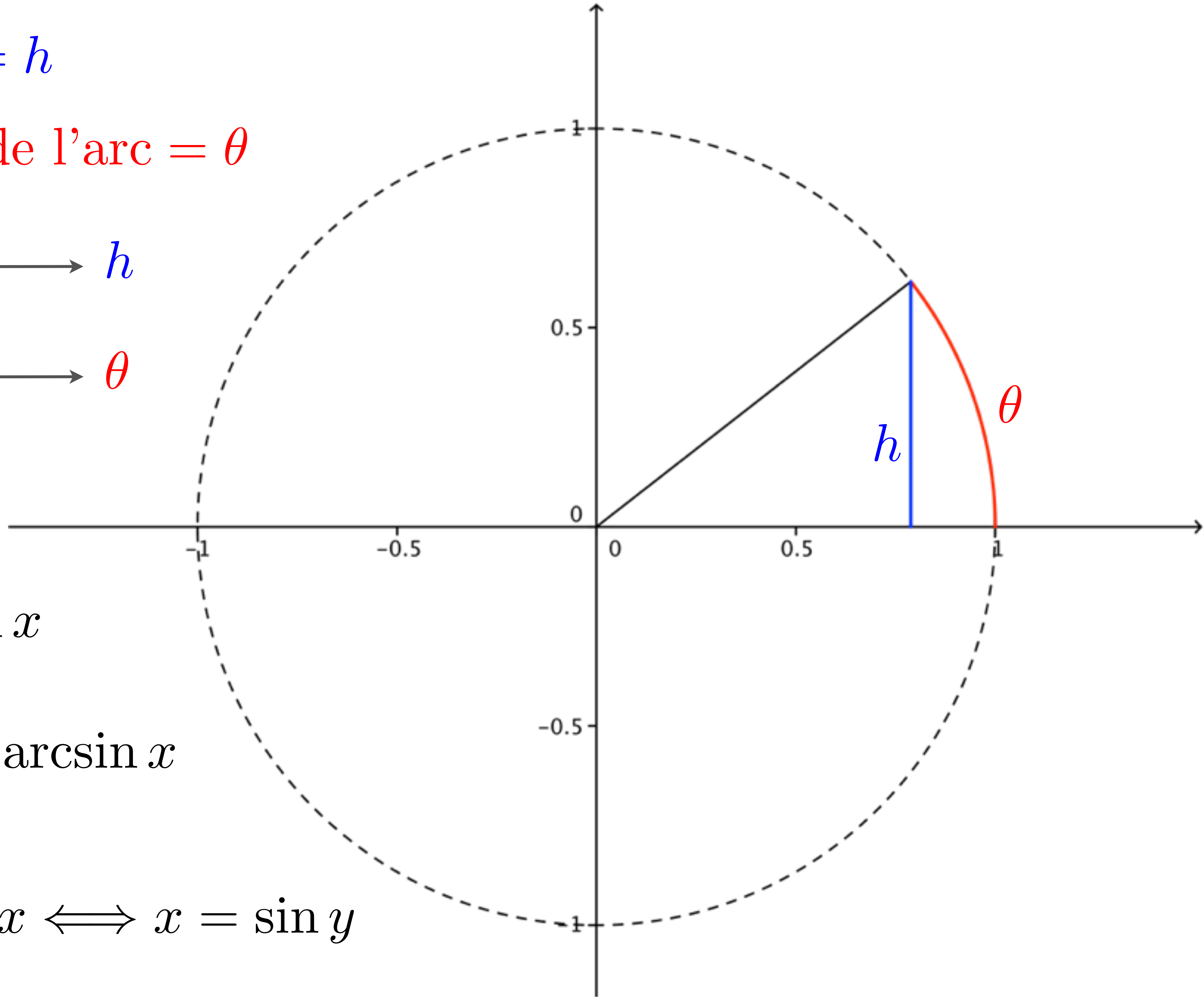
$$\sin(\arcsin x) = \sin(y)$$

$\text{hauteur} = h$

$\text{longueur de l'arc} = \theta$

$$\theta \xrightarrow{\sin} h$$

$$h \xrightarrow{\arcsin} \theta$$

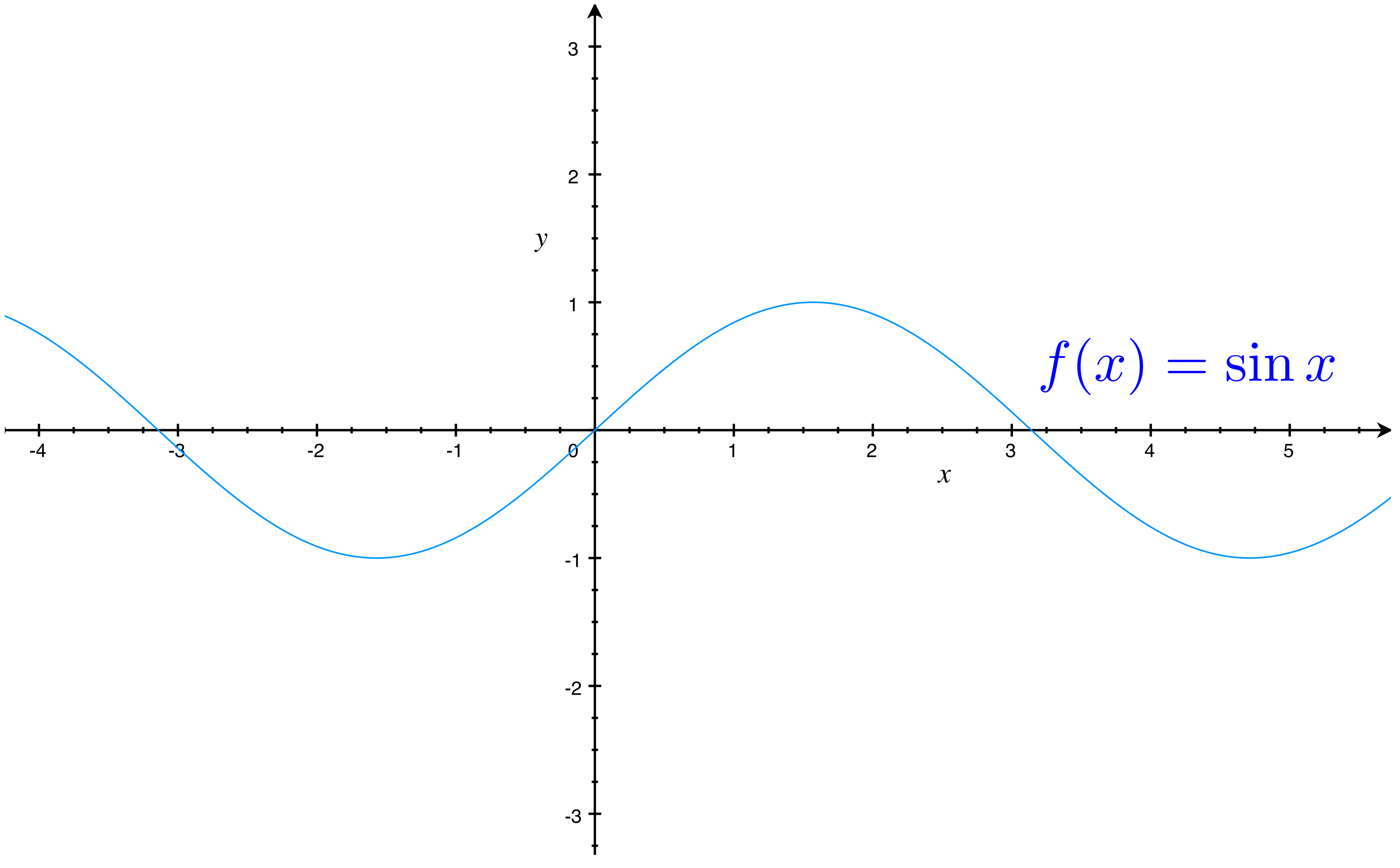


$$f(x) = \sin x$$

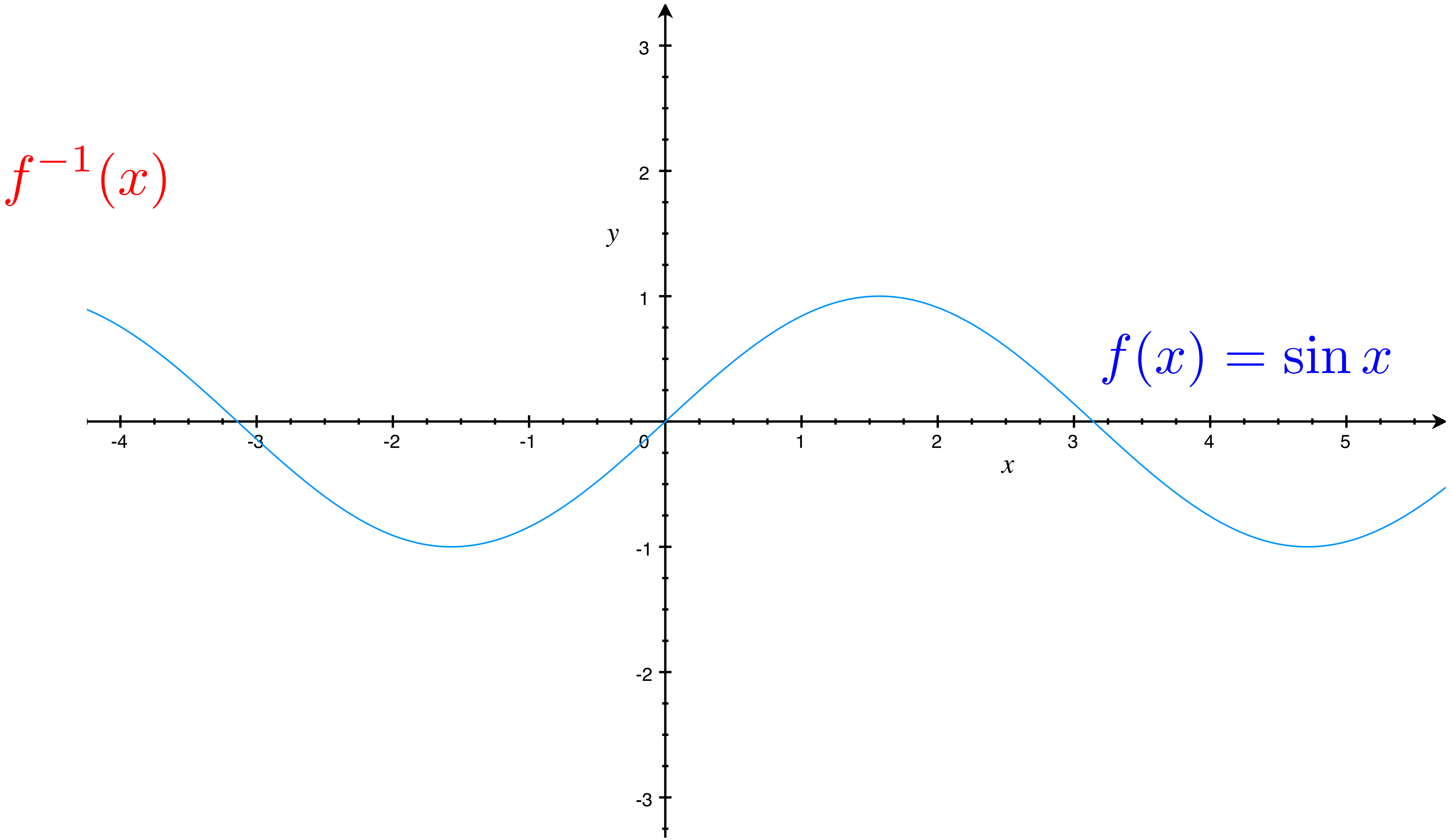
$$f^{-1}(x) = \arcsin x$$

$$y = \arcsin x \iff x = \sin y$$

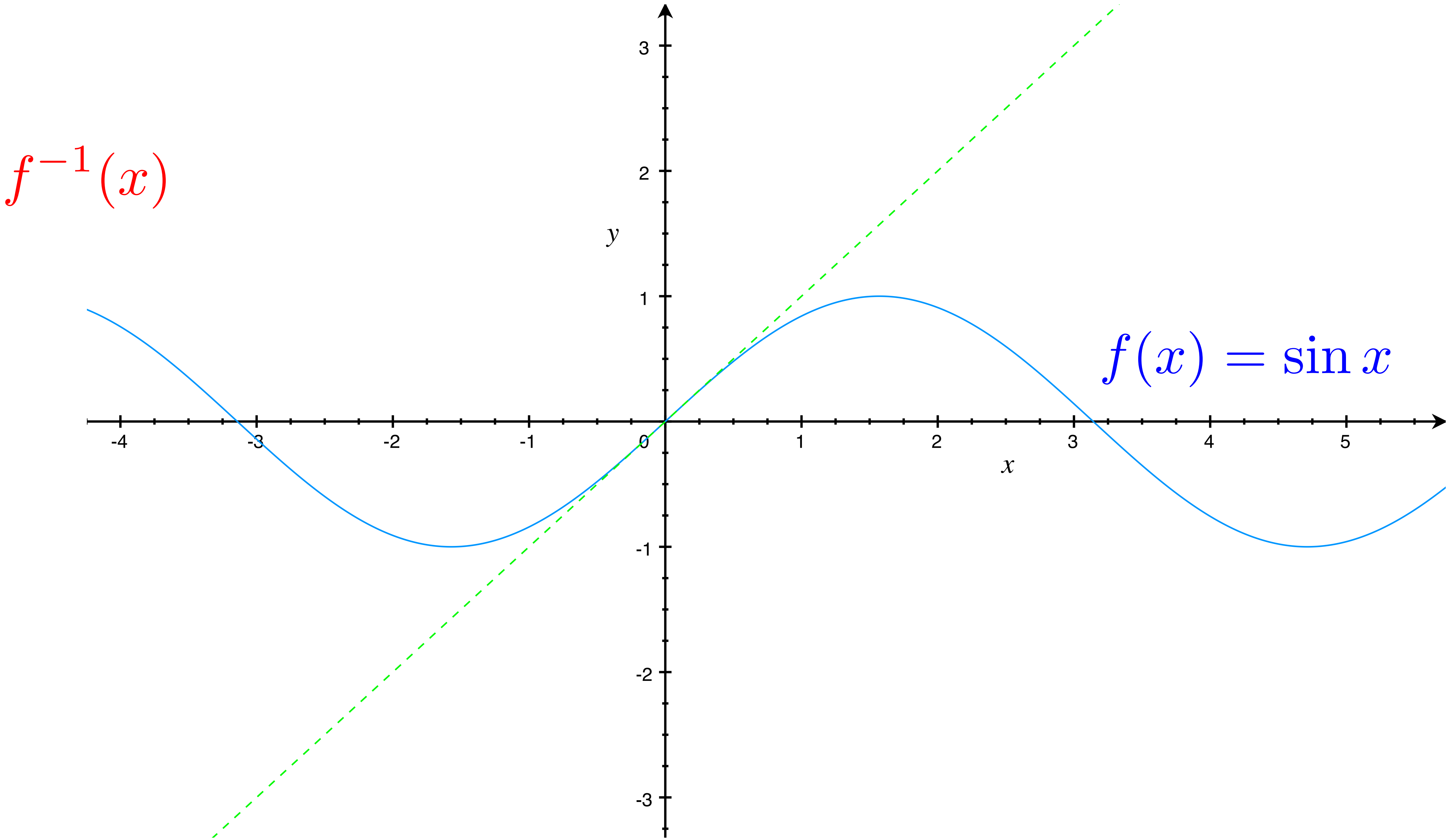
$$\sin(\arcsin x) = \sin(y) = x$$



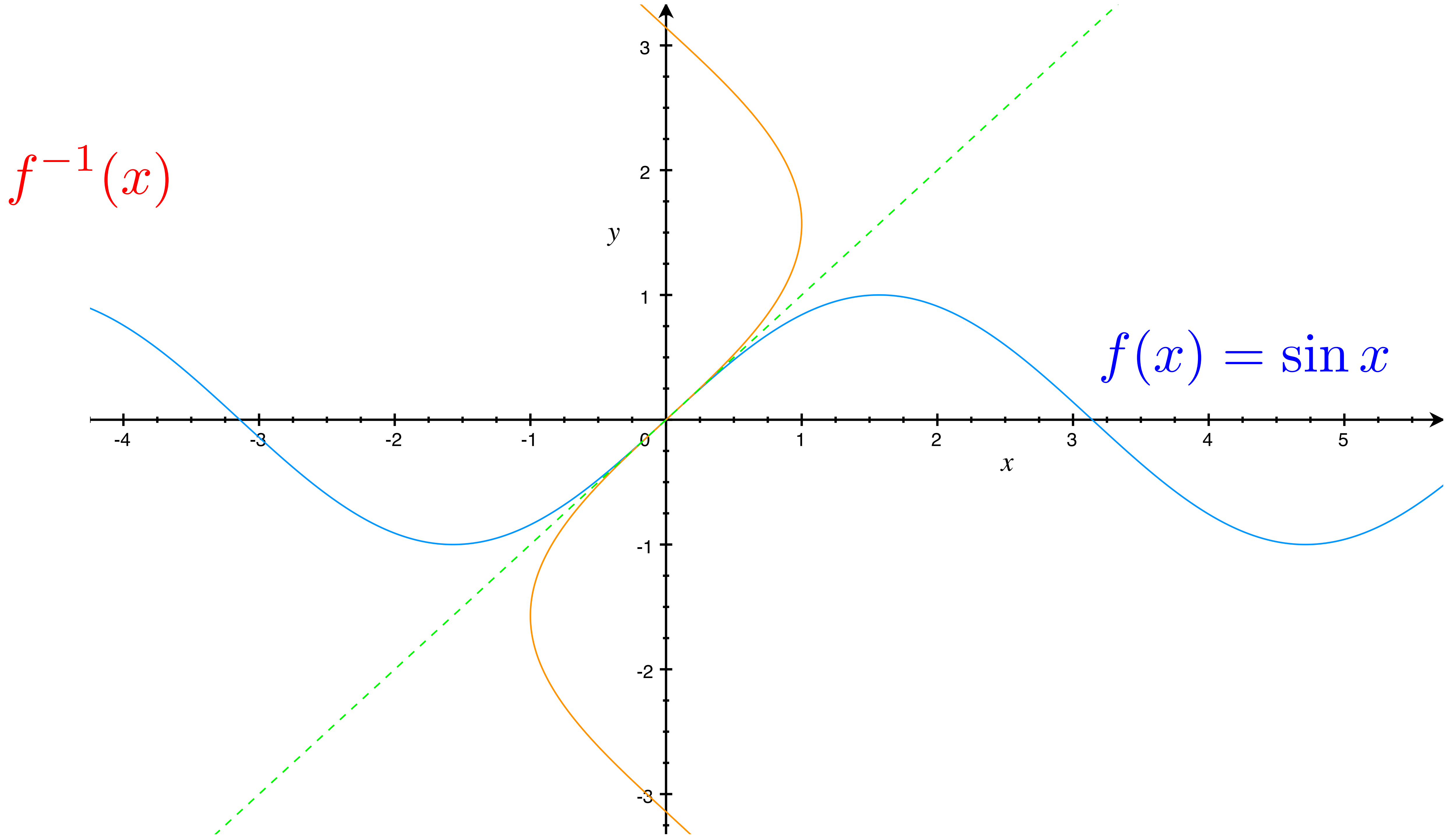
3
2
y
1
$f(x) = \sin x$
-4
-3
-2
-1
0
1
2
3
4
5
x
-1
-2
-3



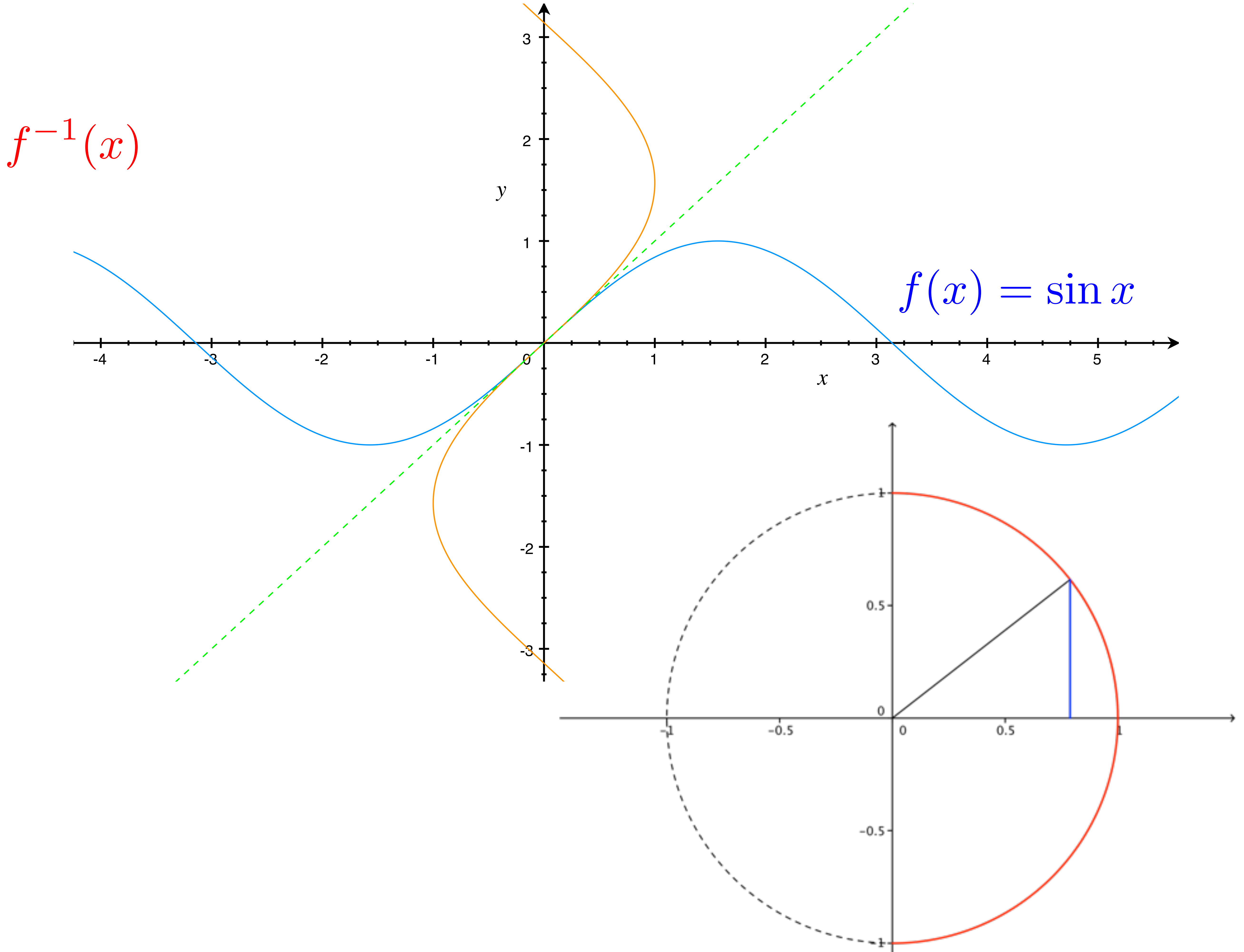
$f^{-1}(x)$
$f(x) = \sin x$
x
y
-4
-3
-2
-1
0
1
2
3
4
5
3
2
1
-1
-2
-3



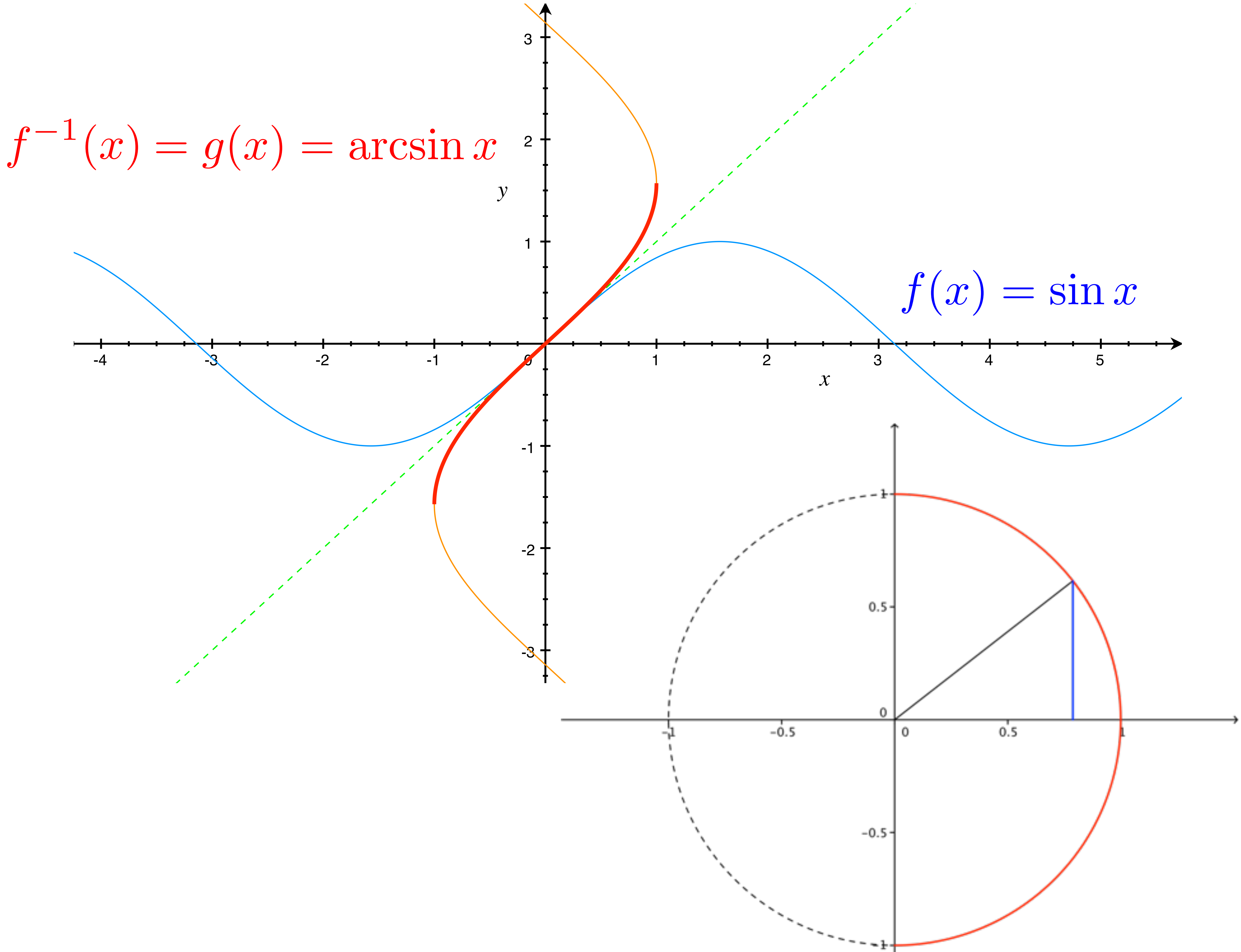
$f^{-1}(x)$
$f(x) = \sin x$
y
x
3
2
1
-1
-2
-3
-4
-3
-2
-1
0
1
2
3
4
5



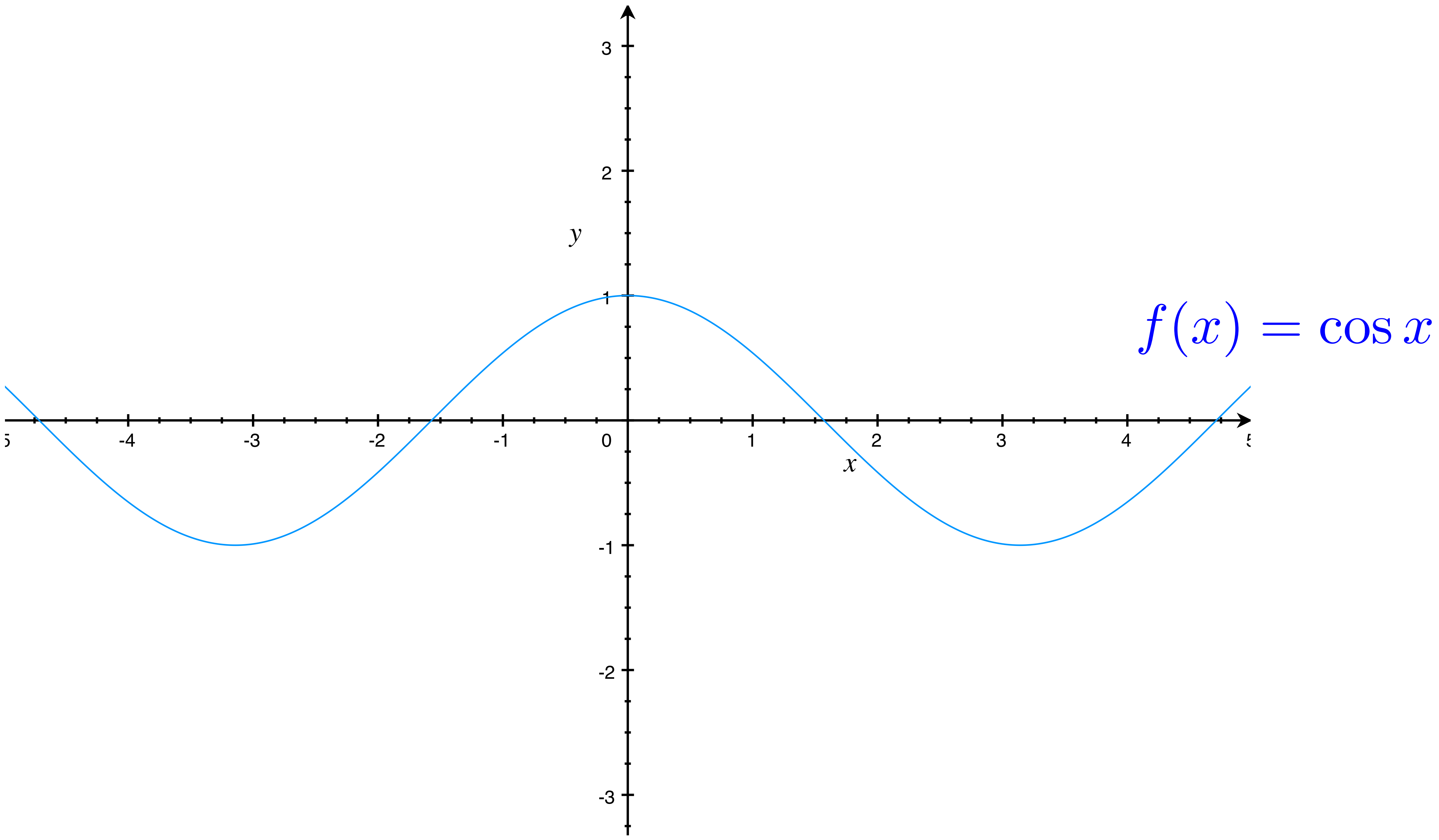
$f^{-1}(x)$
$f(x) = \sin x$
y
x
3
2
1
-1
-2
-3
-4
-3
-2
-1
0
1
2
3
4
5



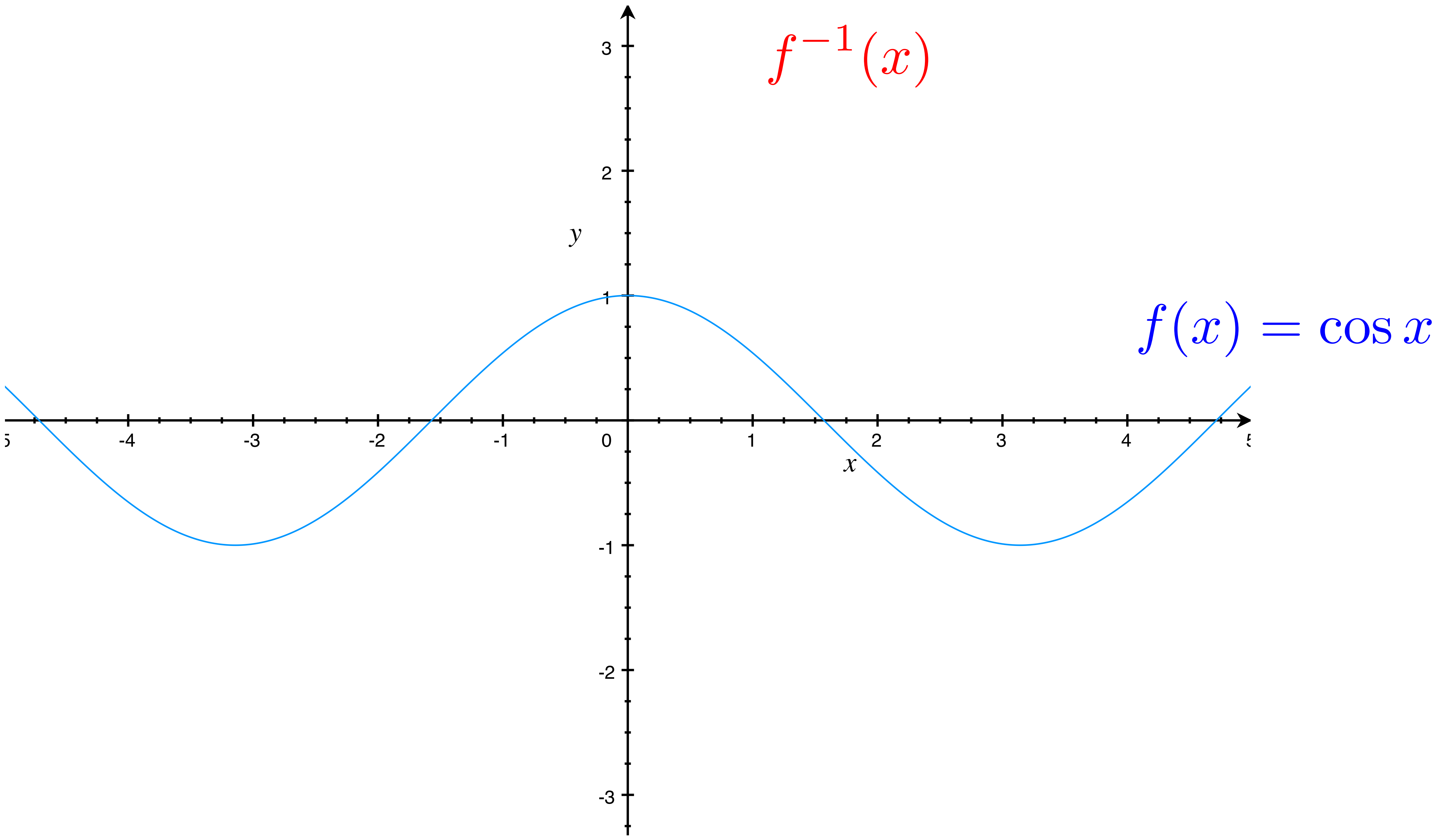
$f^{-1}(x)$
$f(x) = \sin x$
x
y



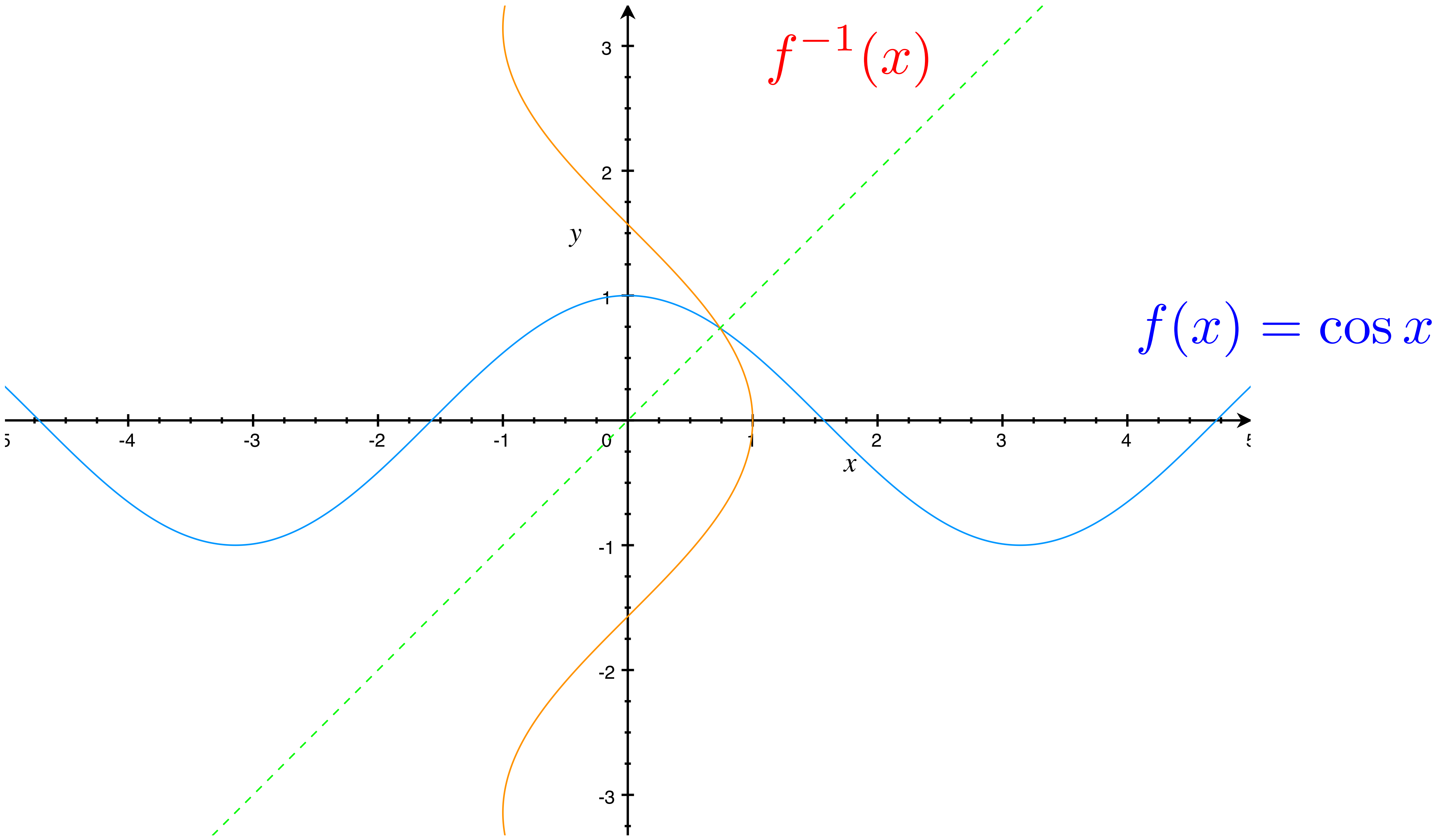
$f^{-1}(x) = g(x) = \arcsin x$
$f(x) = \sin x$
y
x



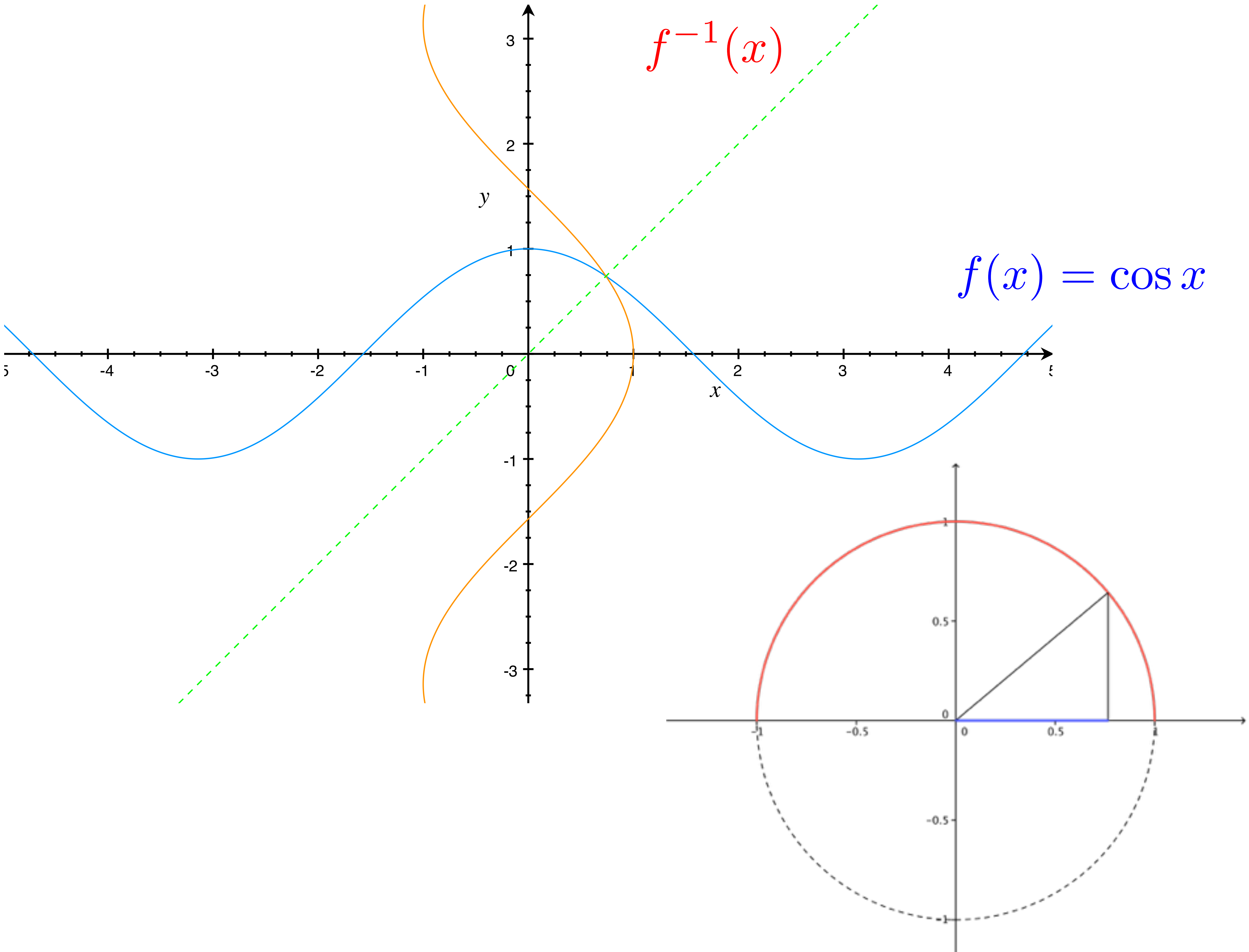
y
x
3
2
1
0
-1
-2
-3
-4
4
5
$f(x) = \cos x$

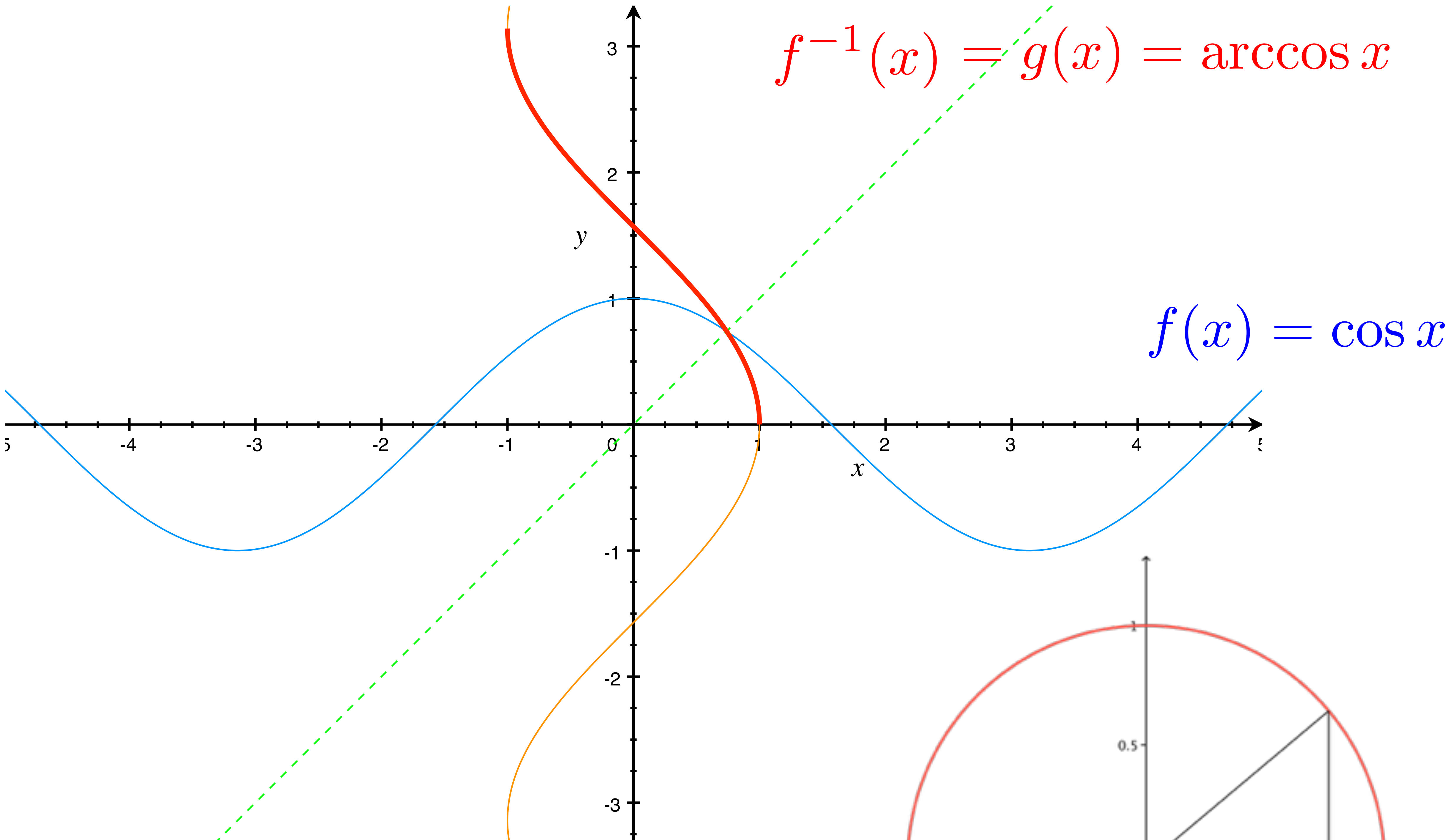


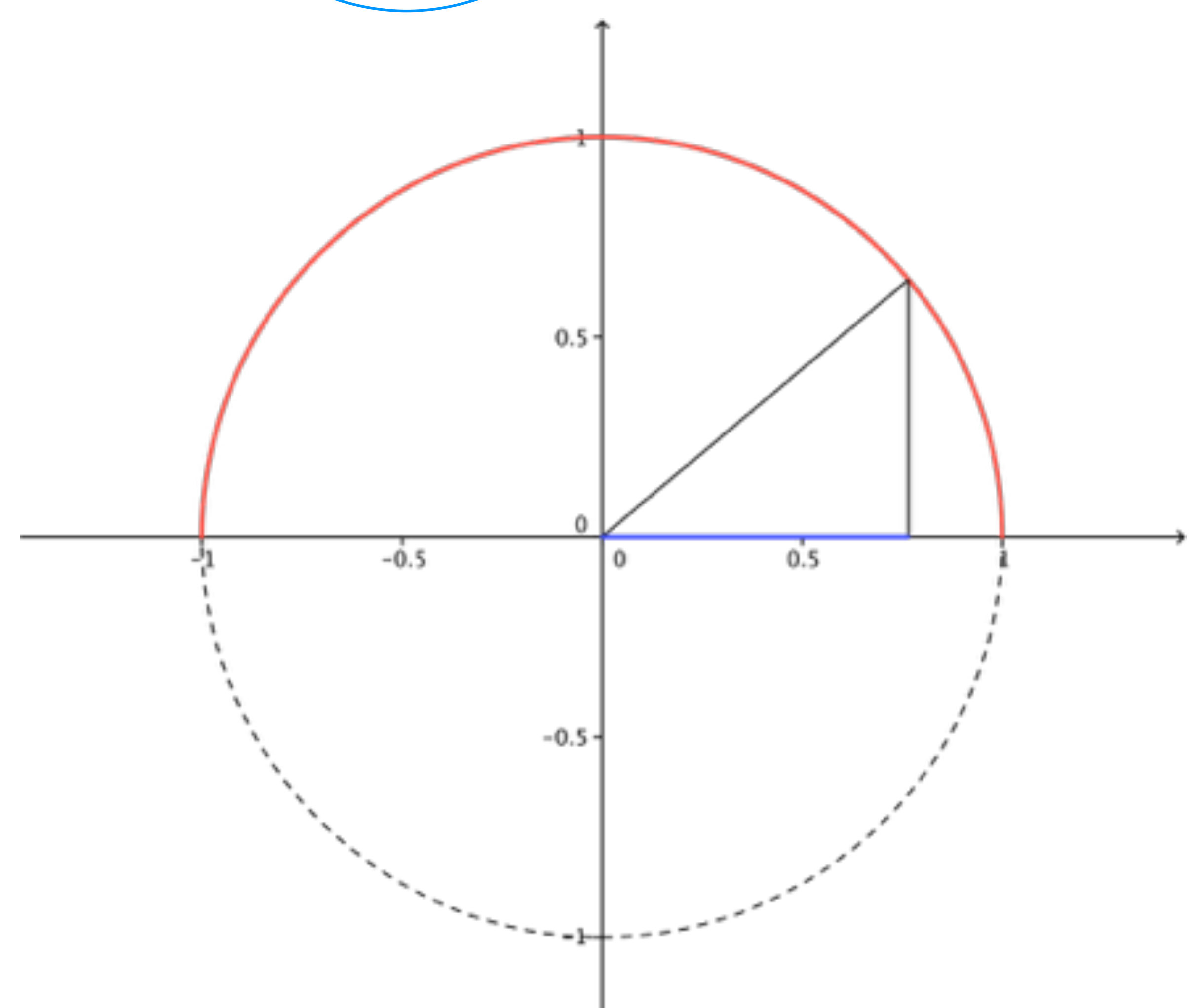
$f^{-1}(x)$
$f(x) = \cos x$
y
x
3
2
1
0
-1
-2
-3
-4
4

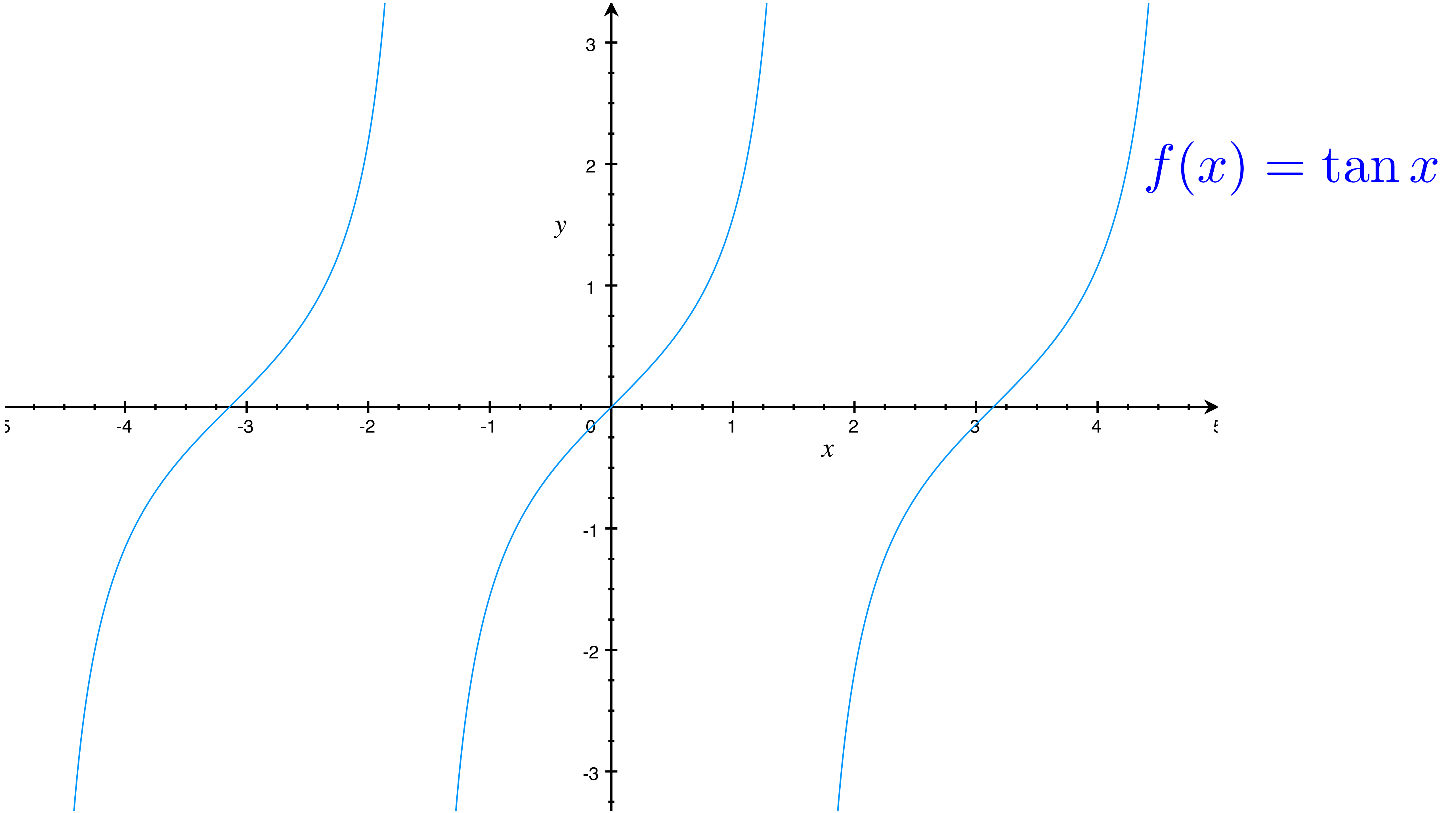


$f^{-1}(x)$
$f(x) = \cos x$
y
x
3
2
1
-1
-2
-3
-4
-3
-2
-1
0
1
2
3
4

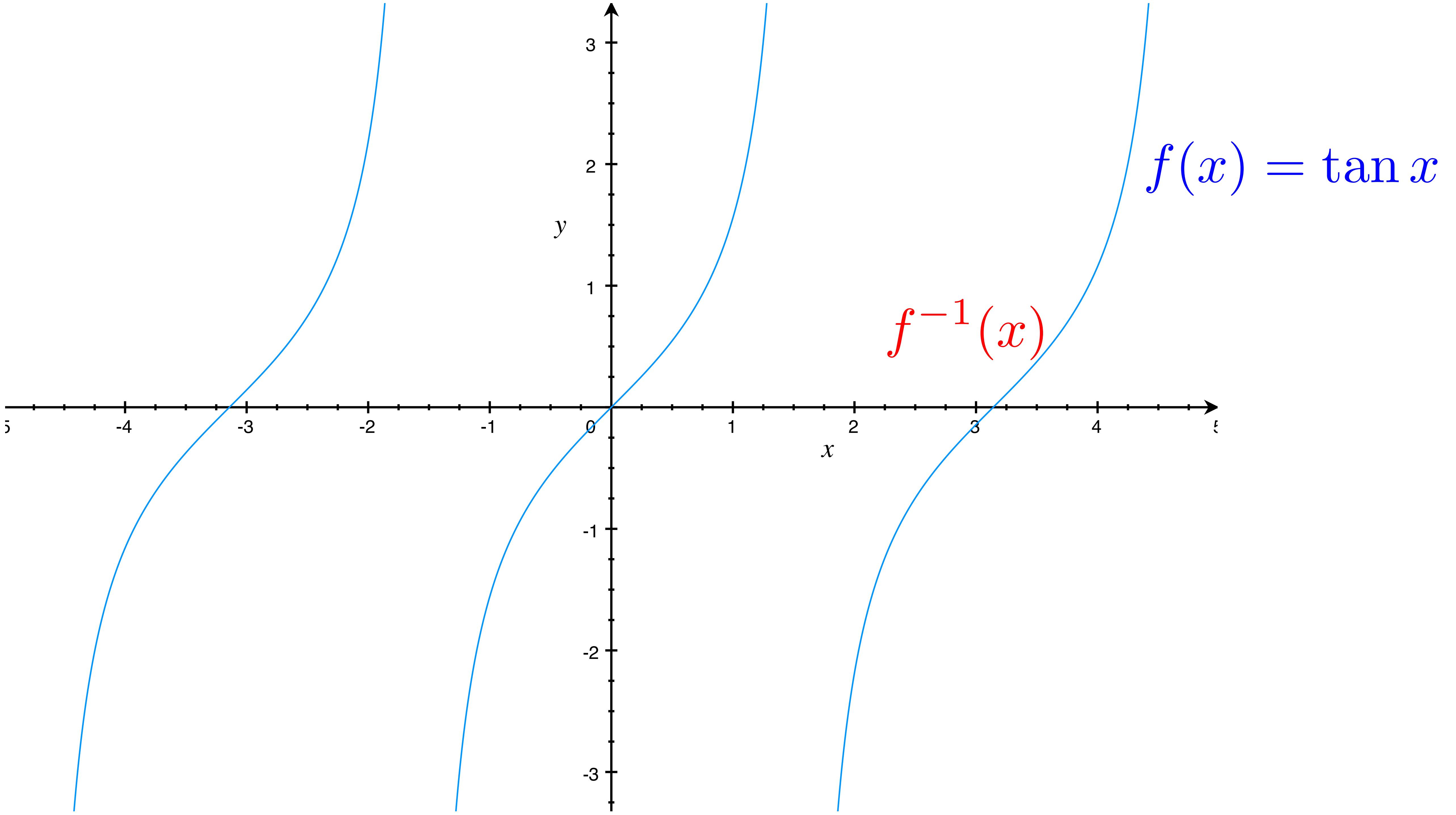

$f^{-1}(x)$
$f(x) = \cos x$
y
x


$f^{-1}(x) = g(x) = \arccos x$
$f(x) = \cos x$
y
x

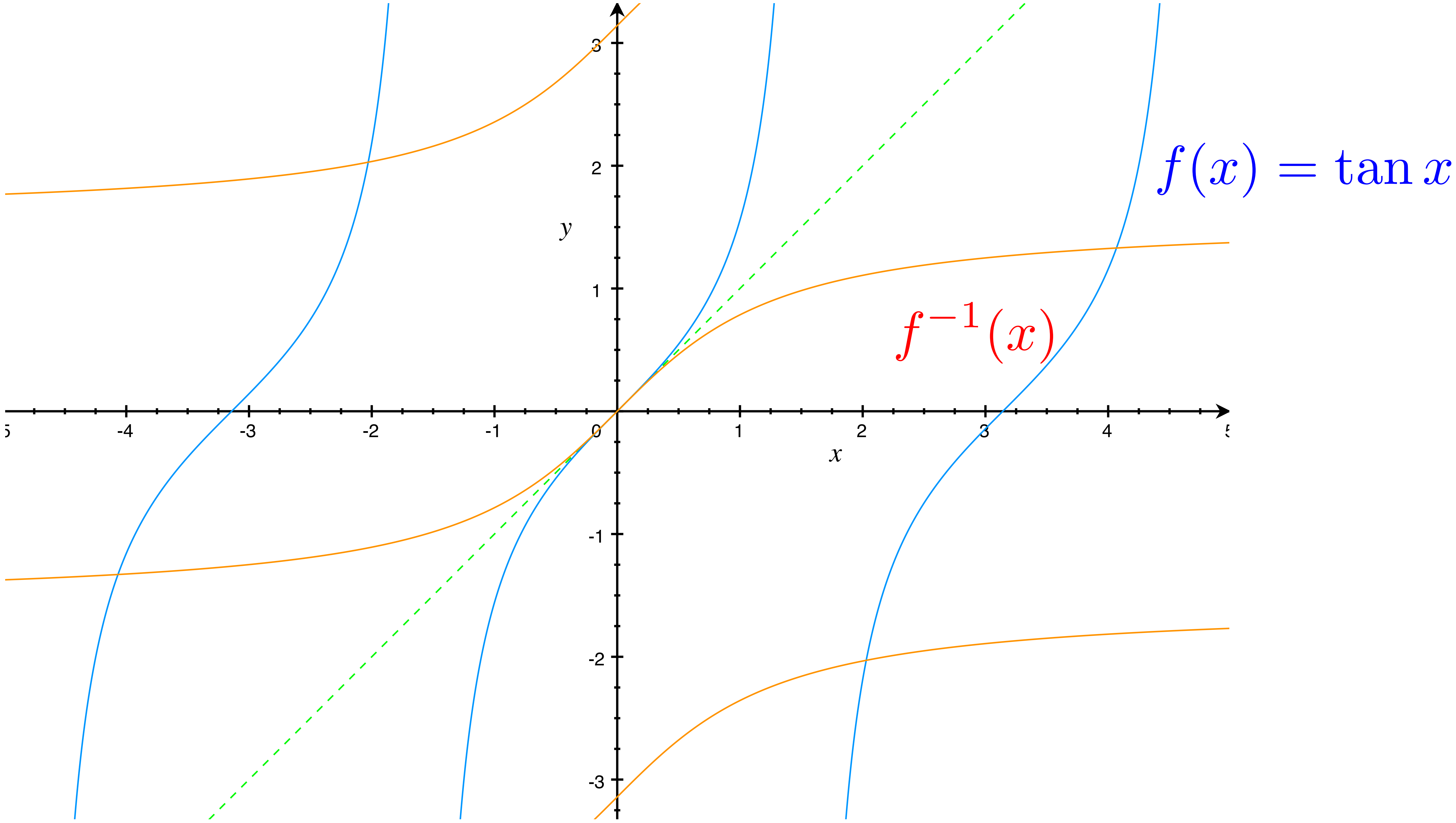




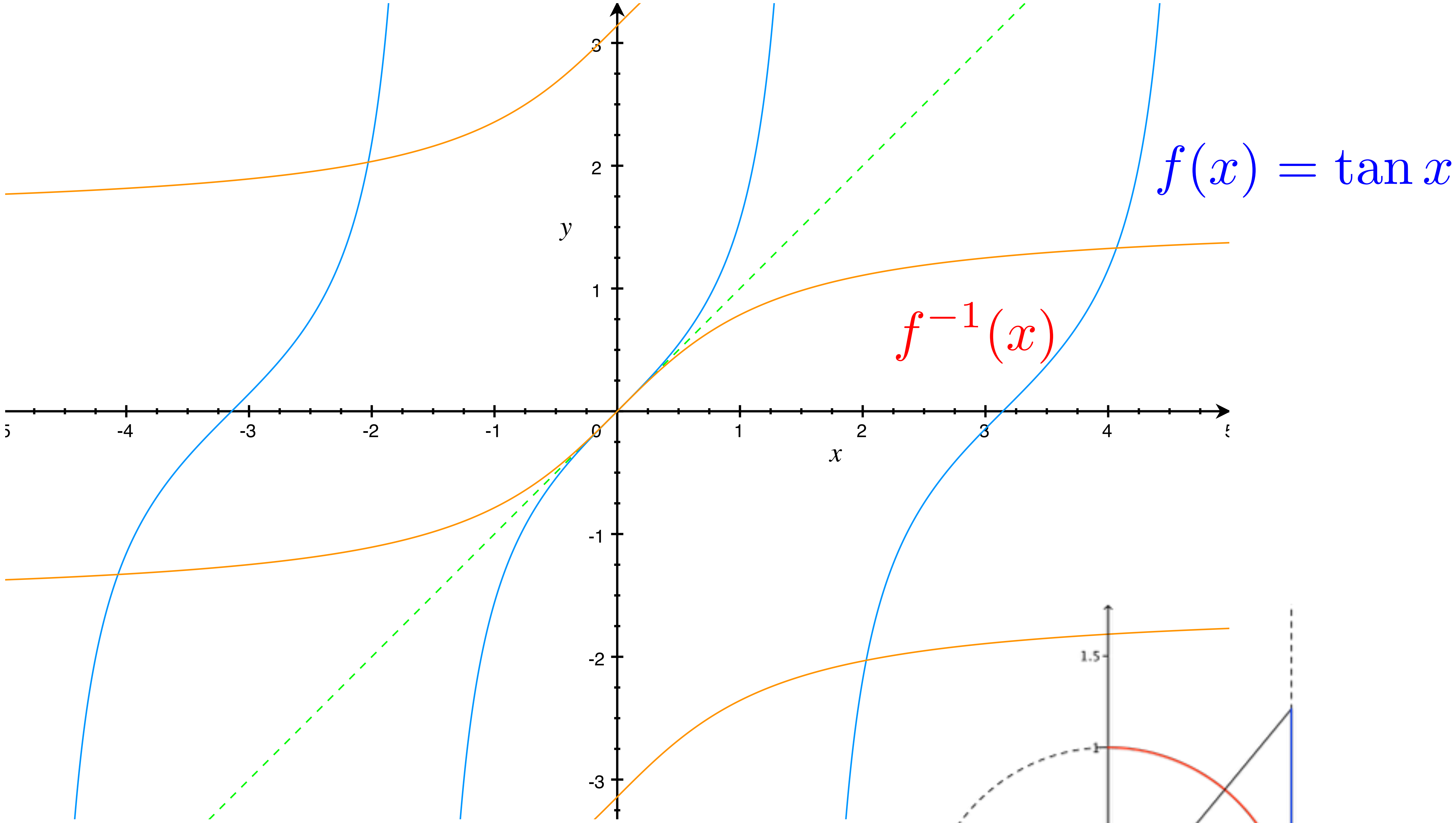
$f(x) = \tan x$
y
x
3
2
1
-1
-2
-3
-4
-3
-2
-1
0
1
2
3
4



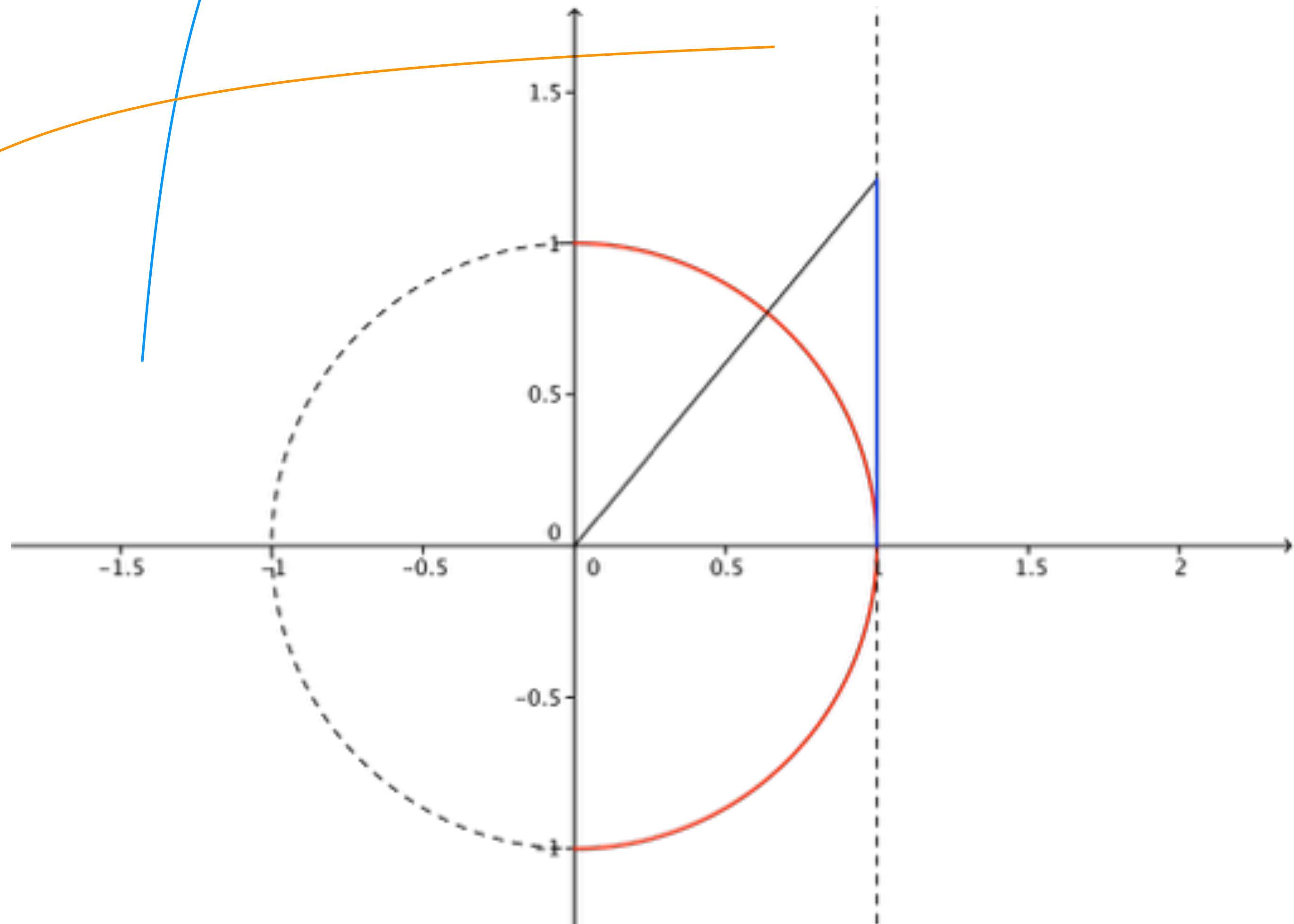
$f(x) = \tan x$
$f^{-1}(x)$
y
x
3
2
1
-1
-2
-3
-4
-3
-2
-1
0
1
2
3
4



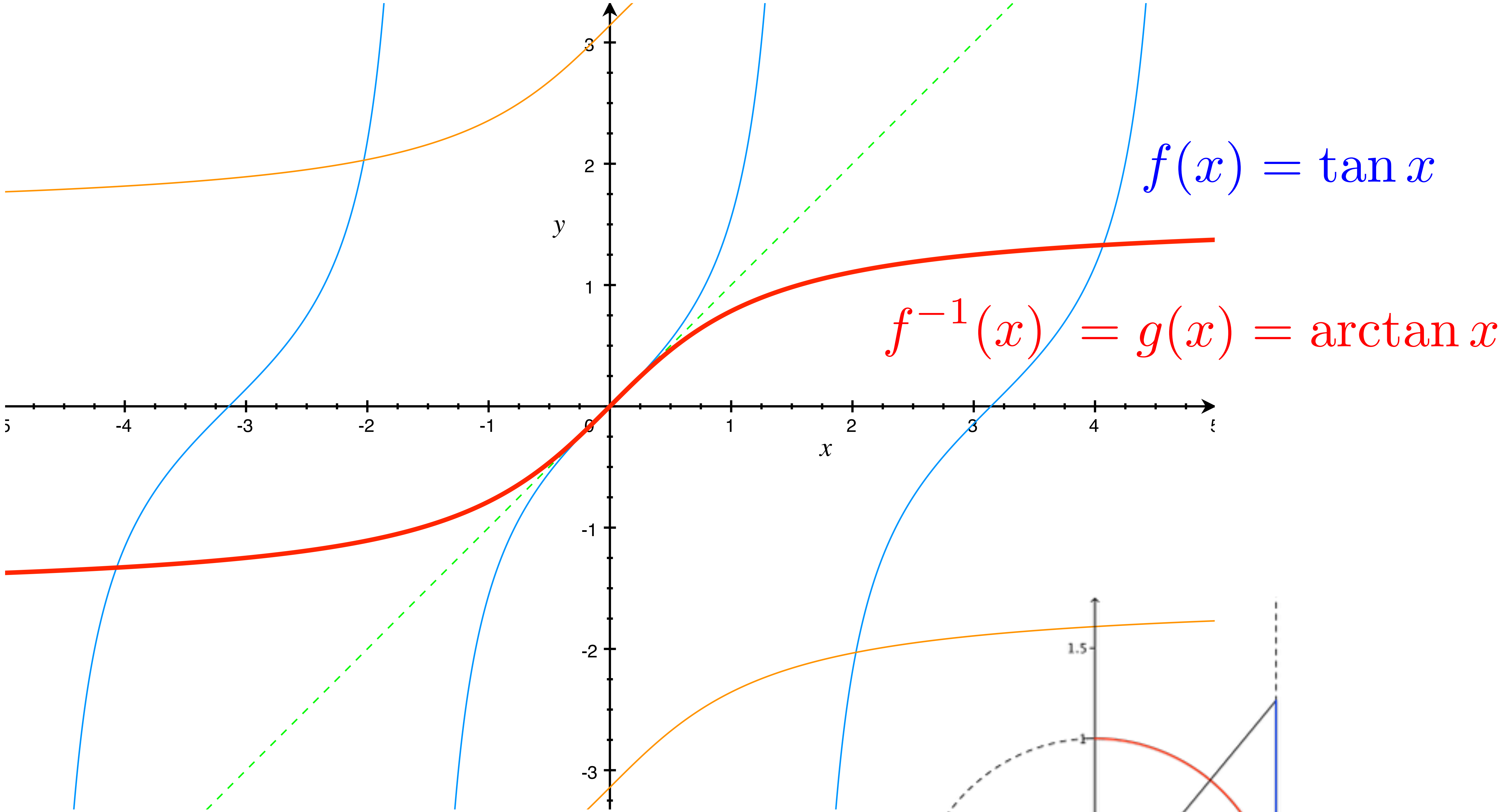
$f(x) = \tan x$
$f^{-1}(x)$
y
x



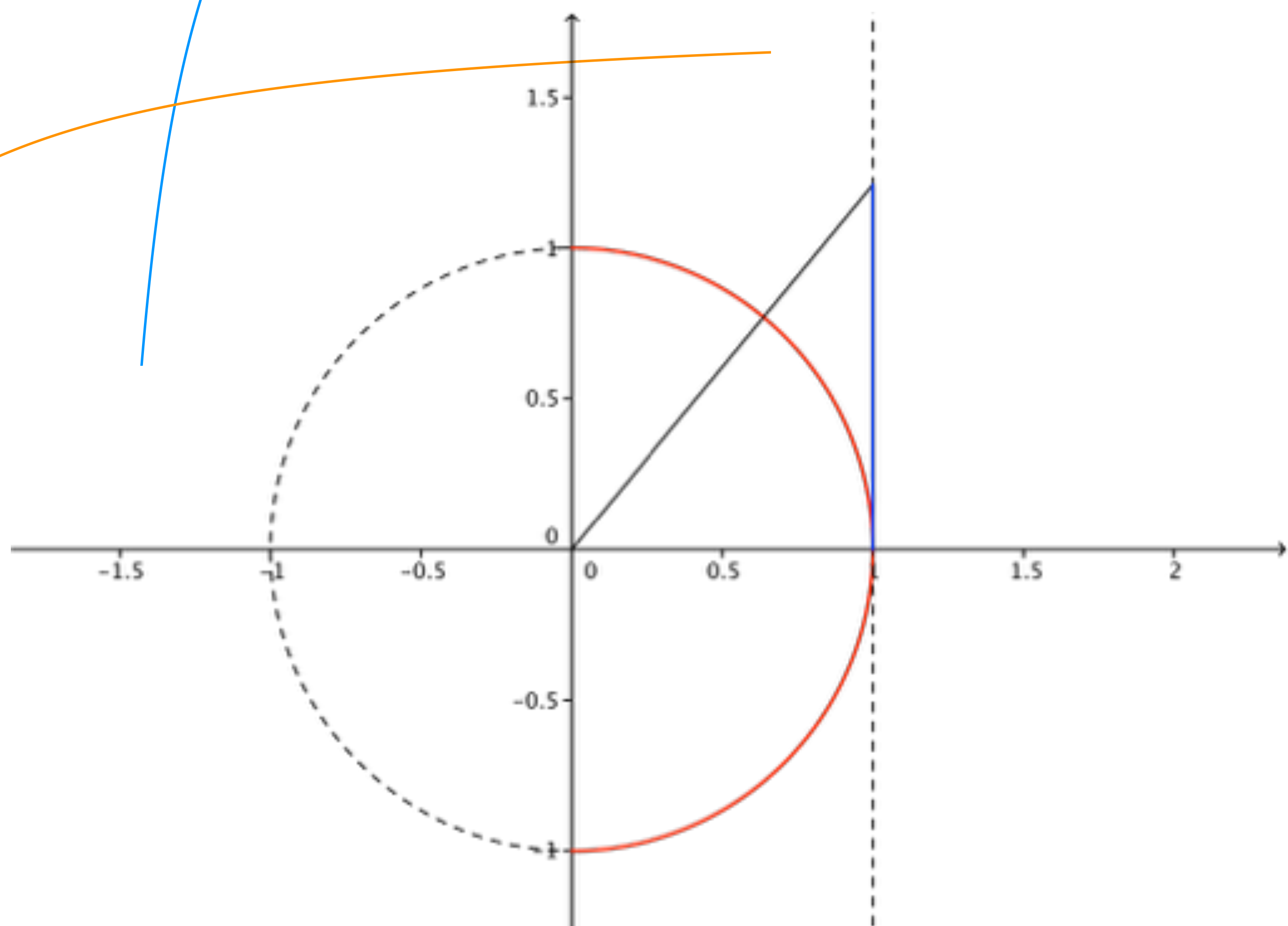
$f(x) = \tan x$
$f^{-1}(x)$
y
x
-4
-3
-2
-1
0
1
2
3
4
3
2
1
-1
-2
-3



1.5
1
0.5
0
-0.5
-1
-1.5
-1
-0.5
0
0.5
1
1.5
2



$f(x) = \tan x$
$f^{-1}(x) = g(x) = \arctan x$
y
x
3
2
1
-1
-2
-3
-4
-3
-2
-1
0
1
2
3
4



1.5
1
0.5
0
-0.5
-1
-1.5
-1
-0.5
0
0.5
1
1.5
2

Faites les exercices suivants

Section 4 # 9

$$(\arcsin x)' = \lim_{h \to 0} \frac{\arcsin(x+h) - \arcsin x}{h}$$

$$(\arcsin x)' = \lim_{h \to 0} \frac{\arcsin(x+h) - \arcsin x}{h} \quad = ???$$

$$(\arcsin x)' = \lim_{h \to 0} \frac{\arcsin(x+h) - \arcsin x}{h} \quad =???$$

$$y = \arcsin x \Longleftrightarrow x = \sin y$$

$$(\arcsin x)' = \lim_{h\to 0} \frac{\arcsin(x+h) - \arcsin x}{h} \quad =???$$

$$y = \arcsin x \Longleftrightarrow x = \sin y$$

$$(\sin y)' = x'$$

$$(\arcsin x)' = \lim_{h \to 0} \frac{\arcsin(x+h) - \arcsin x}{h} \quad = ???$$

$$y = \arcsin x \iff x = \sin y$$

$$(\sin y)' = x'$$

$$(\cos y) y' = 1$$

$$(\arcsin x)' = \lim_{h \to 0} \frac{\arcsin(x+h) - \arcsin x}{h} \quad = ???$$

$$y = \arcsin x \iff x = \sin y$$

$$(\sin y)' = x'$$

$$(\cos y) y' = 1$$

$$y' = \frac{1}{\cos y}$$

$$(\arcsin x)' = \lim_{h\to 0} \frac{\arcsin(x+h) - \arcsin x}{h} \quad =???$$

$$y = \arcsin x \iff x = \sin y$$

$$(\sin y)' = x'$$

$$(\cos y)y' = 1$$

$$y' = \frac{1}{\cos y}$$

$$\sin^2 y + \cos^2 y = 1$$

$$(\arcsin x)' = \lim_{h\to 0} \frac{\arcsin(x+h) - \arcsin x}{h} \quad =???$$

$$y = \arcsin x \Longleftrightarrow x = \sin y$$

$$(\sin y)' = x'$$

$$(\cos y) y' = 1$$

$$y' = \frac{1}{\cos y}$$

$$\sin^2 y + \cos^2 y = 1$$

$$\cos^2 y = 1 - \sin^2 y$$

$$(\arcsin x)' = \lim_{h \to 0} \frac{\arcsin(x+h) - \arcsin x}{h} \quad =???$$

$$y = \arcsin x \iff x = \sin y$$

$$(\sin y)' = x'$$

$$(\cos y) y' = 1$$

$$y' = \frac{1}{\cos y}$$

$$\sin^2 y + \cos^2 y = 1$$

$$\cos^2 y = 1 - \sin^2 y$$

$$\cos y = \sqrt{1 - \sin^2 y}$$

$$(\arcsin x)' = \lim_{h\to 0} \frac{\arcsin(x+h) - \arcsin x}{h} \quad =???$$

$$y = \arcsin x \Longleftrightarrow x = \sin y$$

$$(\sin y)' = x'$$

$$(\cos y)y' = 1$$

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

$$\sin^2 y + \cos^2 y = 1$$

$$\cos^2 y = 1 - \sin^2 y$$

$$\cos y = \sqrt{1 - \sin^2 y}$$

$$(\arcsin x)' = \lim_{h\to 0} \frac{\arcsin(x+h) - \arcsin x}{h} \quad = ???$$

$$y = \arcsin x \Longleftrightarrow x = \sin y$$

$$(\sin y)' = x'$$

$$(\cos y) y' = 1$$

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

$$\sin^2 y + \cos^2 y = 1$$

$$\cos^2 y = 1 - \sin^2 y$$

$$\cos y = \sqrt{1 - \sin^2 y}$$

$$(\arcsin x)' = \lim_{h\to 0} \frac{\arcsin(x+h) - \arcsin x}{h} \quad = ???$$

$$y = \arcsin x \Longleftrightarrow x = \sin y$$

$$(\sin y)' = x'$$

$$(\cos y)y' = 1$$

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

$$= \frac{1}{\sqrt{1-x^2}}$$

$$\sin^2 y + \cos^2 y = 1$$

$$\cos^2 y = 1 - \sin^2 y$$

$$\cos y = \sqrt{1-\sin^2 y}$$

$$(\arcsin x)' = \lim_{h\to 0} \frac{\arcsin(x+h) - \arcsin x}{h} \quad = ???$$

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$$\sin^2 y + \cos^2 y = 1$$

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$$\cos y = \sqrt{1 - \sin^2 y}$$

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

$$y = \arccos x \Longleftrightarrow x = \cos y$$

$$y = \arccos x \iff x = \cos y$$

$$(\cos y)' = x'$$

$$y = \arccos x \iff x = \cos y$$

$$(\cos y)' = x'$$

$$(-\sin y)y' = 1$$

$$y = \arccos x \iff x = \cos y$$

$$(\cos y)' = x'$$

$$(-\sin y)y' = 1$$

$$y' = \frac{-1}{\sin y}$$

$$y = \arccos x \iff x = \cos y$$

$$(\cos y)' = x'$$

$$(-\sin y) y' = 1$$

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

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$$(\arccos x)' = \frac{-1}{\sqrt{1-x^2}}$$

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$$(\arccos x)' = \frac{-1}{\sqrt{1-x^2}}$$

$$y = \arctan x \iff x = \tan y$$

$$y = \arctan x \Longleftrightarrow x = \tan y$$

$$(\tan y)' = x'$$

$$y = \arctan x \iff x = \tan y$$

$$(\tan y)' = x'$$

$$(\sec^2 y) y' = 1$$

$$y = \arctan x \iff x = \tan y$$

$$(\tan y)' = x'$$

$$(\sec^2 y) y' = 1$$

$$y' = \frac{1}{\sec^2 y}$$

$$y = \arctan x \iff x = \tan y$$

$$(\tan y)' = x'$$

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

$$(\sec^2 y)y' = 1$$

$$y' = \frac{1}{\sec^2 y}$$

$$y = \arctan x \Longleftrightarrow x = \tan y$$

$$(\tan y)' = x'$$

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

$$(\sec^2 y) y' = 1$$

$$y' = \frac{1}{\sec^2 y} = \frac{1}{1 + (\tan y)^2}$$

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$$(\arctan x)' = \frac{1}{1 + x^2}$$

$$y = \mathrm{arccot} x \Longleftrightarrow x = \cot y$$

$$y = \mathrm{arccot} x \iff x = \cot y$$

$$(\cot y)' = x'$$

$$y = \mathrm{arccot} x \Longleftrightarrow x = \cot y$$

$$(\cot y)' = x'$$

$$(-\csc^2 y)y' = 1$$

$$y = \text{arccot} x \iff x = \cot y$$

$$(\cot y)' = x'$$

$$(-\csc^2 y)y' = 1$$

$$y' = \frac{-1}{\csc^2 y}$$

$$y = \operatorname{arccot} x \Longleftrightarrow x = \cot y$$

$$(\cot y)' = x'$$

$$\csc^2 y = 1 + \cot^2 y$$

$$(-\csc^2 y)y' = 1$$

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$$(\cot y)' = x'$$

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$$(\operatorname{arccot} x)' = \frac{-1}{1 + x^2}$$

$$y = \operatorname{arcsec} x \iff x = \sec y$$

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$$(\sec y)' = x'$$

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$$(\sec y \tan y) y' = 1$$

$$y = \operatorname{arcsec} x \iff x = \sec y$$

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$$y' = \frac{1}{\sec y \tan y}$$

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$$y' = \frac{1}{\sec y \tan y}$$

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

$$y = \operatorname{arcsec} x \iff x = \sec y$$

$$(\sec y)' = x'$$

$$(\sec y \tan y) y' = 1$$

$$y' = \frac{1}{\sec y \tan y}$$

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

$$\tan^2 y = \sec^2 y - 1$$

$$y = \operatorname{arcsec} x \Longleftrightarrow x = \sec y$$

$$(\sec y)' = x'$$

$$(\sec y \tan y) y' = 1$$

$$y' = \frac{1}{\sec y \tan y}$$

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

$$\tan^2 y = \sec^2 y - 1$$

$$\tan y = \sqrt{\sec^2 y - 1}$$

$$y = \operatorname{arcsec} x \iff x = \sec y$$

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

$$\tan^2 y = \sec^2 y - 1$$

$$\tan y = \sqrt{\sec^2 y - 1}$$

$$(\sec y)' = x'$$

$$(\sec y \tan y)y' = 1$$

$$y' = \frac{1}{\sec y \tan y}$$

$$= \frac{1}{\sec y \sqrt{(\sec y)^2 - 1}}$$

$$y = \operatorname{arcsec} x \iff x = \sec y$$

$$(\sec y)' = x'$$

$$(\sec y \tan y) y' = 1$$

$$y' = \frac{1}{\sec y \tan y}$$

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$$y = \operatorname{arcsec} x \iff x = \sec y$$

$$(\sec y)' = x'$$

$$(\sec y \tan y) y' = 1$$

$$y' = \frac{1}{\sec y \tan y}$$

$$= \frac{1}{\sec y \sqrt{(\sec y)^2 - 1}} = \frac{1}{x\sqrt{x^2 - 1}}$$

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

$$\tan^2 y = \sec^2 y - 1$$

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$$y = \operatorname{arcsec} x \iff x = \sec y$$

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

$$\tan^2 y = \sec^2 y - 1$$

$$\tan y = \sqrt{\sec^2 y - 1}$$

$$(\sec y)' = x'$$

$$(\sec y \tan y) y' = 1$$

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$$(\sec y)' = x'$$

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$$y' = \frac{1}{\sec y \tan y}$$

$$= \frac{1}{\sec y \sqrt{(\sec y)^2 - 1}} = \frac{1}{x\sqrt{x^2 - 1}}$$

$$(\operatorname{arcsec} x)' = \frac{1}{x\sqrt{x^2 - 1}}$$

$$y = \operatorname{arcsec} x \Longleftrightarrow x = \sec y$$

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

$$\tan^2 y = \sec^2 y - 1$$

$$\tan y = \sqrt{\sec^2 y - 1}$$

$$(\sec y)' = x'$$

$$(\sec y \tan y) y' = 1$$

$$y' = \frac{1}{\sec y \tan y}$$

$$= \frac{1}{\sec y \sqrt{(\sec y)^2 - 1}} = \frac{1}{x\sqrt{x^2 - 1}}$$

$$(\operatorname{arcsec} x)' = \frac{1}{x\sqrt{x^2 - 1}}$$

$$(\operatorname{arccsc} x)' = \frac{-1}{x\sqrt{x^2 - 1}}$$

Exemple

Exemple

$$f(x) = \arcsin(\sqrt{2x^3 + \tan x})$$

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$$f(x) = \arcsin(\sqrt{2x^3 + \tan x})$$

$$f'(x) = \frac{1}{\sqrt{1 - \left(\sqrt{2x^3 + \tan x}\right)^2}} \left(\sqrt{2x^3 + \tan x}\right)'$$

Exemple

$$f(x) = \arcsin(\sqrt{2x^3 + \tan x})$$

$$f'(x) = \frac{1}{\sqrt{1 - \left(\sqrt{2x^3 + \tan x}\right)^2}} \left(\sqrt{2x^3 + \tan x}\right)'$$

Exemple

$$f(x) = \arcsin(\sqrt{2x^3 + \tan x})$$

$$f'(x) = \frac{1}{\sqrt{1 - (\sqrt{2x^3 + \tan x})^2}} \left(\sqrt{2x^3 + \tan x}\right)'$$

Exemple

$$f(x) = \arcsin(\sqrt{2x^3 + \tan x})$$

$$f'(x) = \frac{1}{\sqrt{1 - \left(\sqrt{2x^3 + \tan x}\right)^2}} \left(\sqrt{2x^3 + \tan x}\right)'$$

$$= \frac{1}{\sqrt{1 - \left(\sqrt{2x^3 + \tan x}\right)^2}} \frac{1}{2\sqrt{2x^3 + \tan x}} (2x^3 + \tan x)'$$

Exemple

$$f(x) = \arcsin(\sqrt{2x^3 + \tan x})$$

$$f'(x) = \frac{1}{\sqrt{1 - (\sqrt{2x^3 + \tan x})^2}} \left(\sqrt{2x^3 + \tan x}\right)'$$

$$= \frac{1}{\sqrt{1 - (\sqrt{2x^3 + \tan x})^2}} \frac{1}{2\sqrt{2x^3 + \tan x}} (2x^3 + \tan x)'$$

$$= \frac{6x^2 + \sec^2 x}{\sqrt{1 - (2\sqrt{2x^3 + \tan x})^2}\sqrt{2x^3 + \tan x}}$$

Faites les exercices suivants

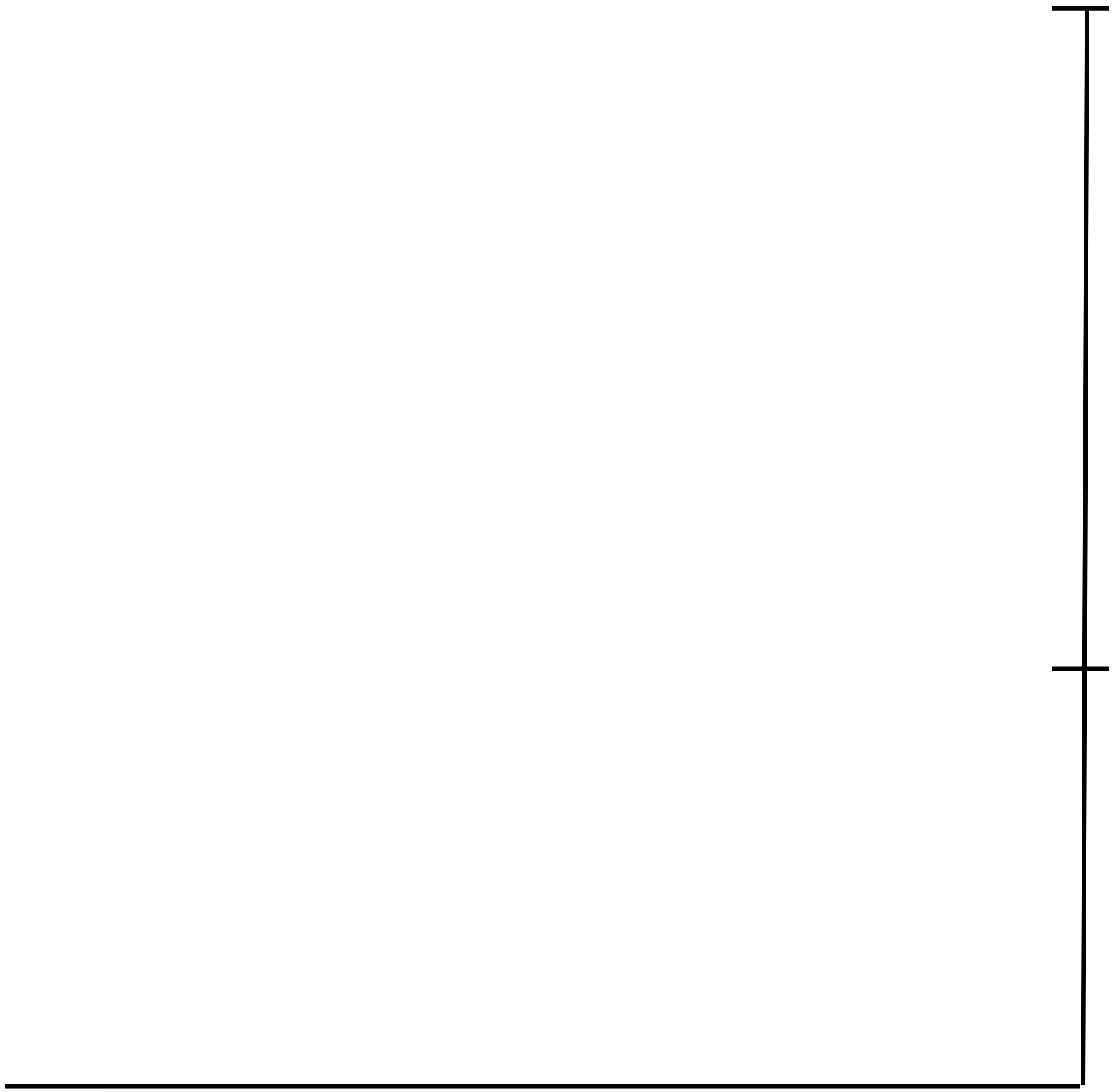
11

Exemple

Au cinéma:

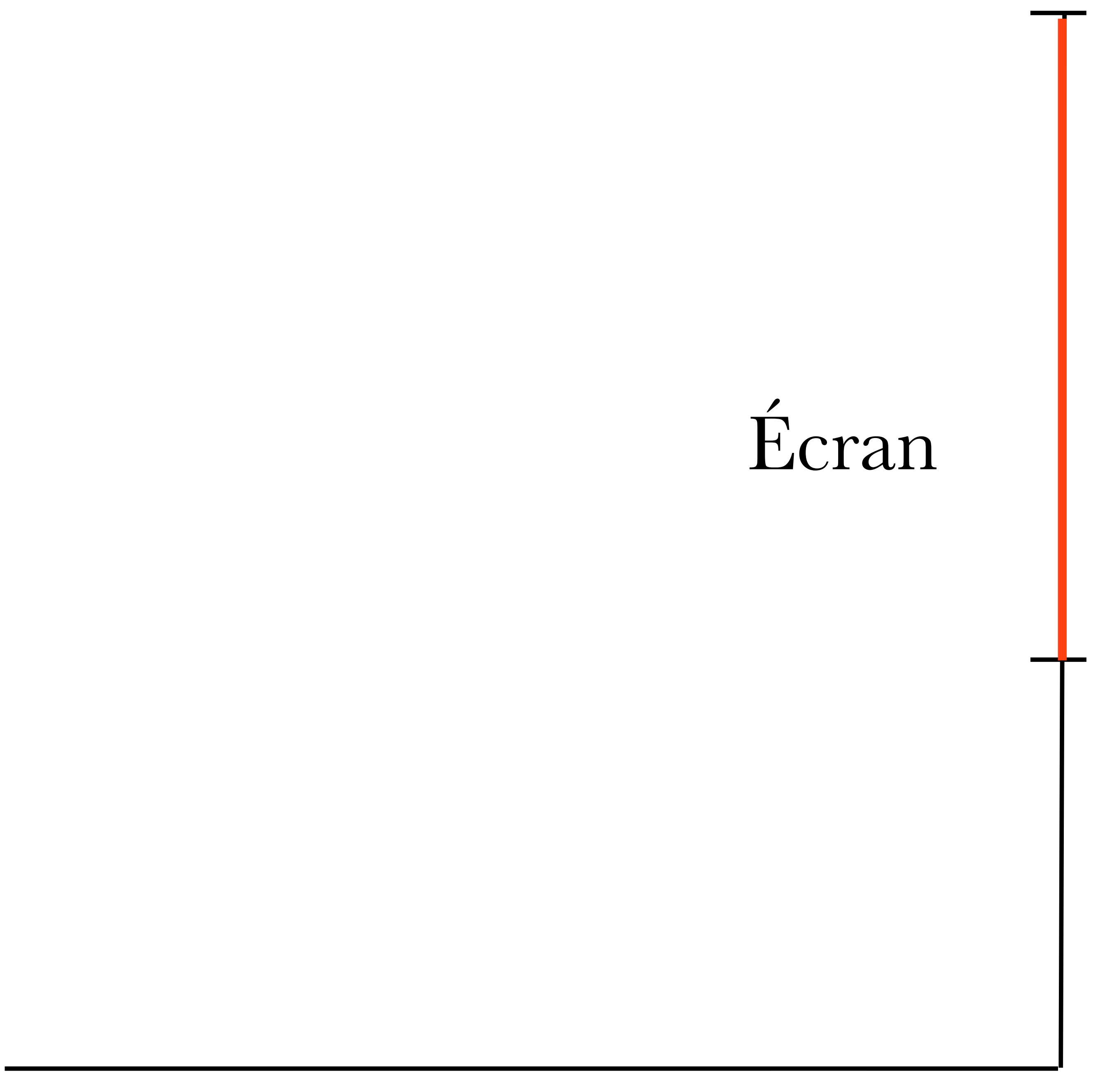
Exemple

Au cinéma:



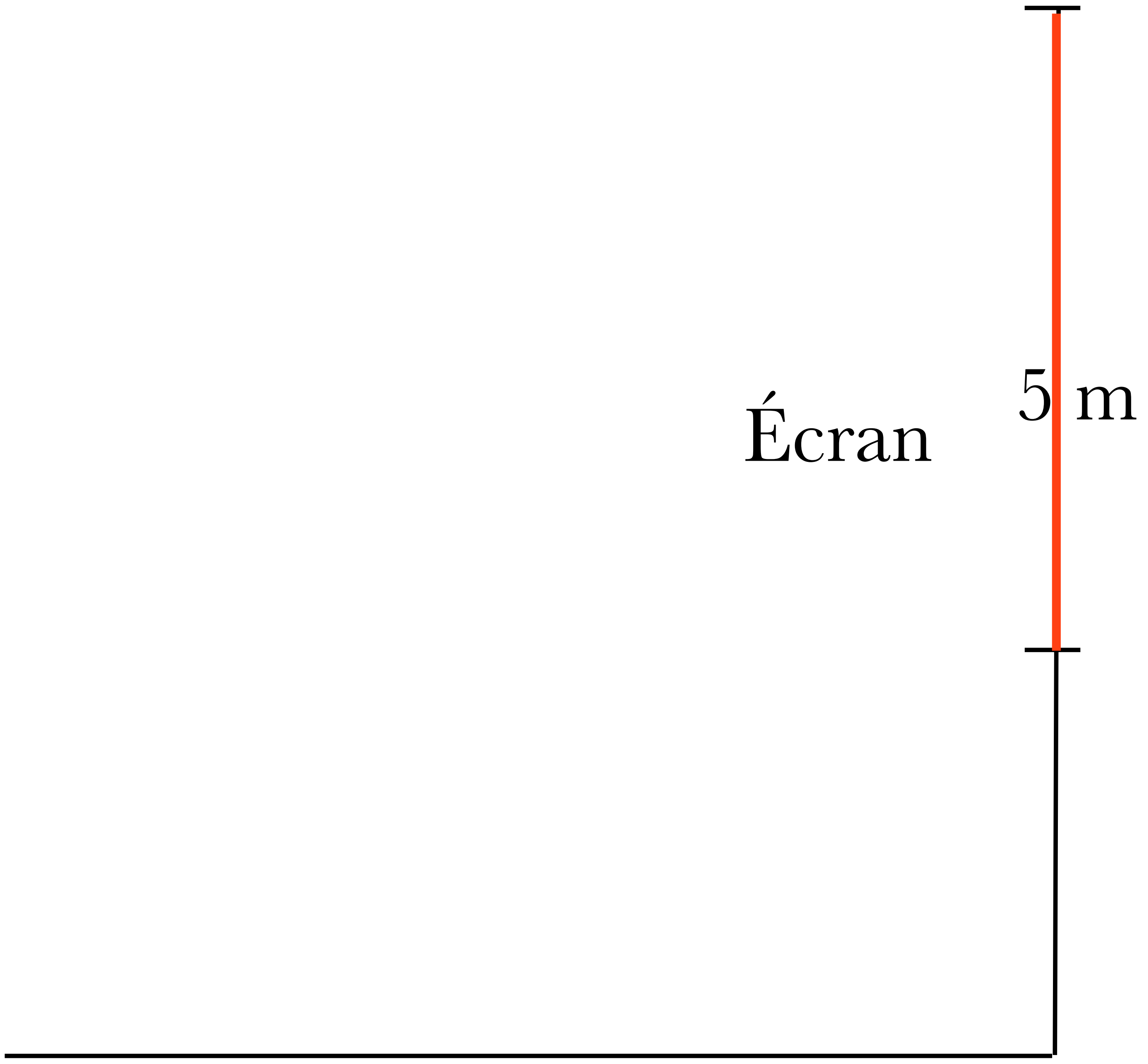
Exemple

Au cinéma:



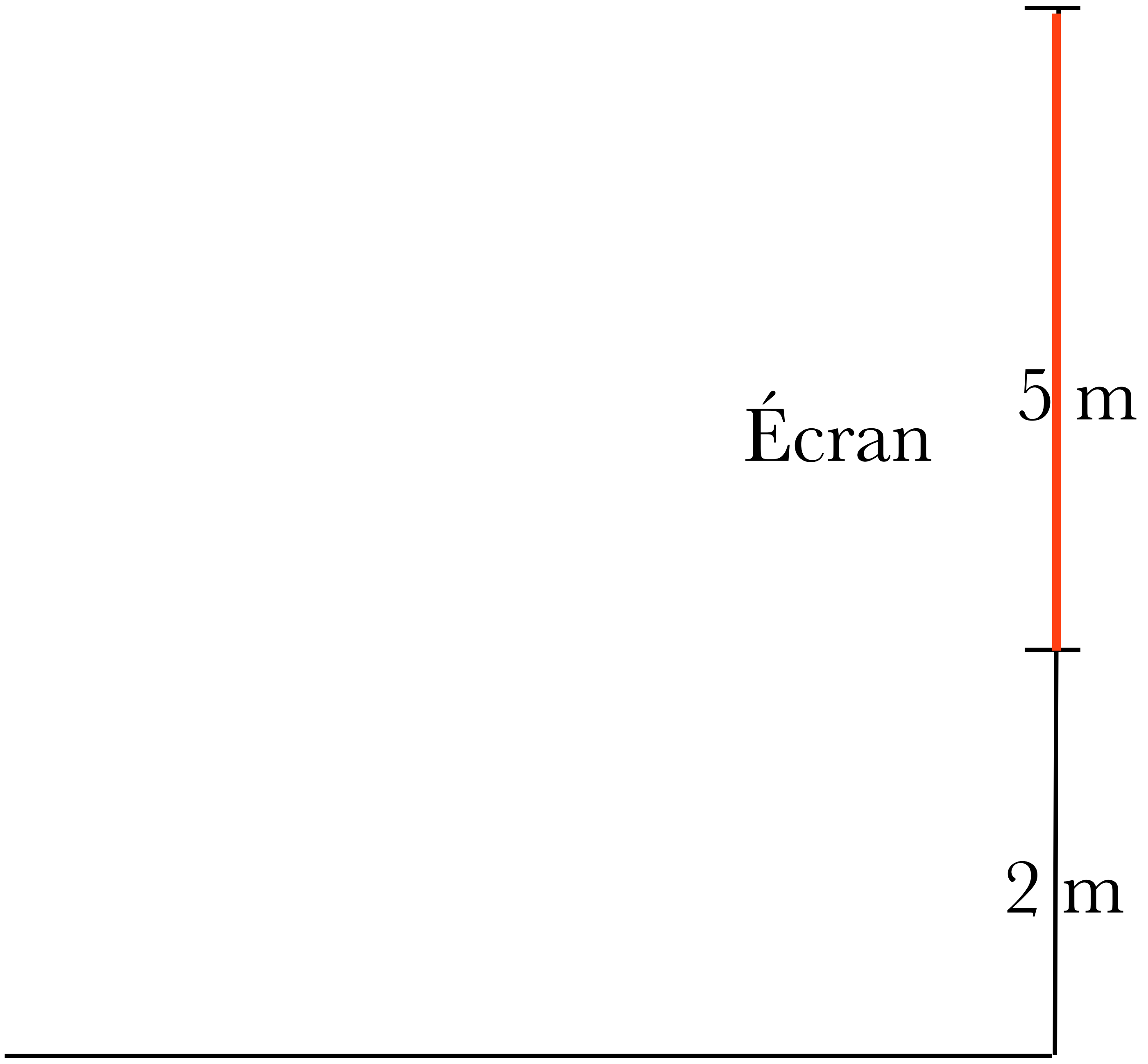
Exemple

Au cinéma:



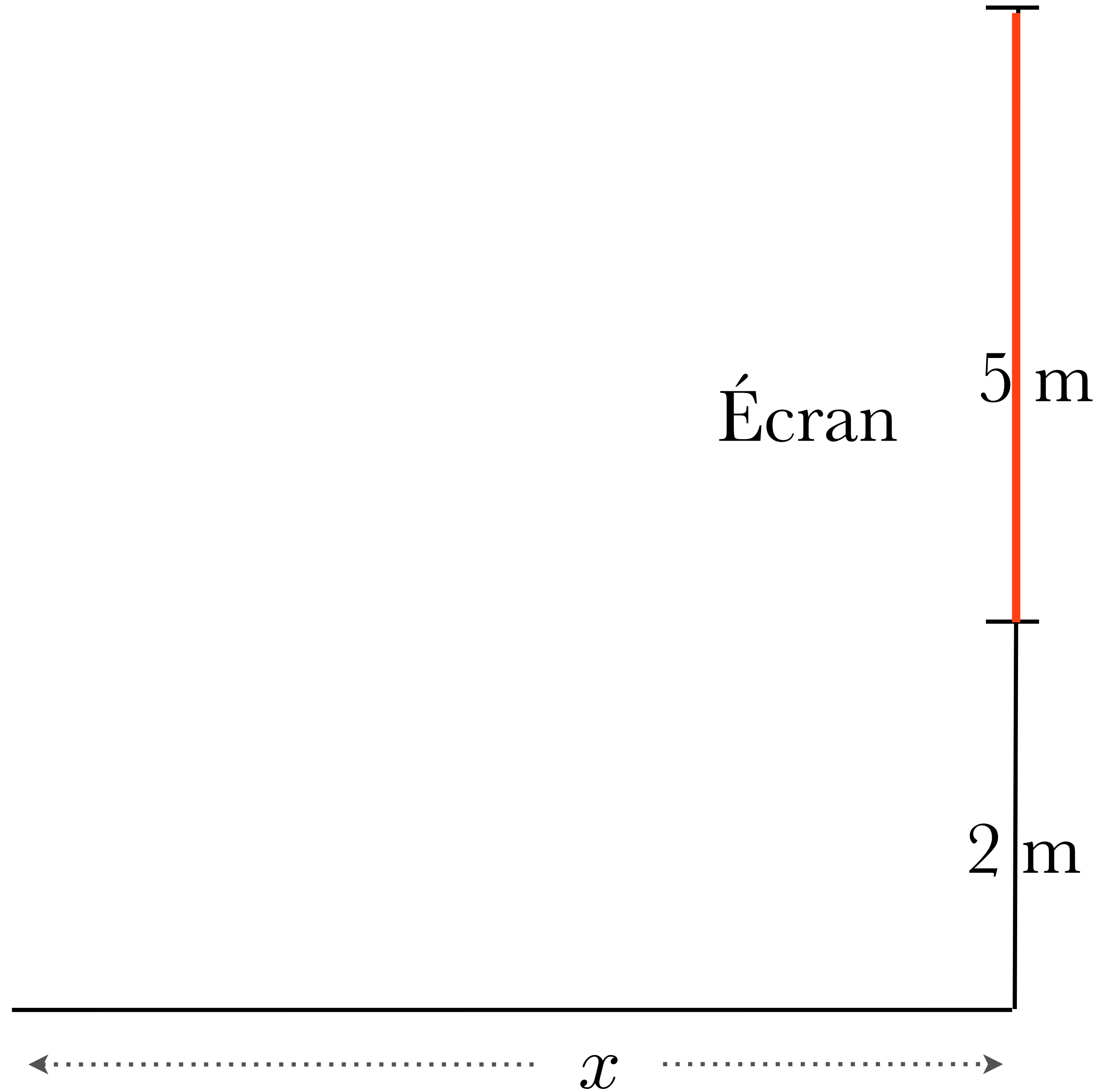
Exemple

Au cinéma:



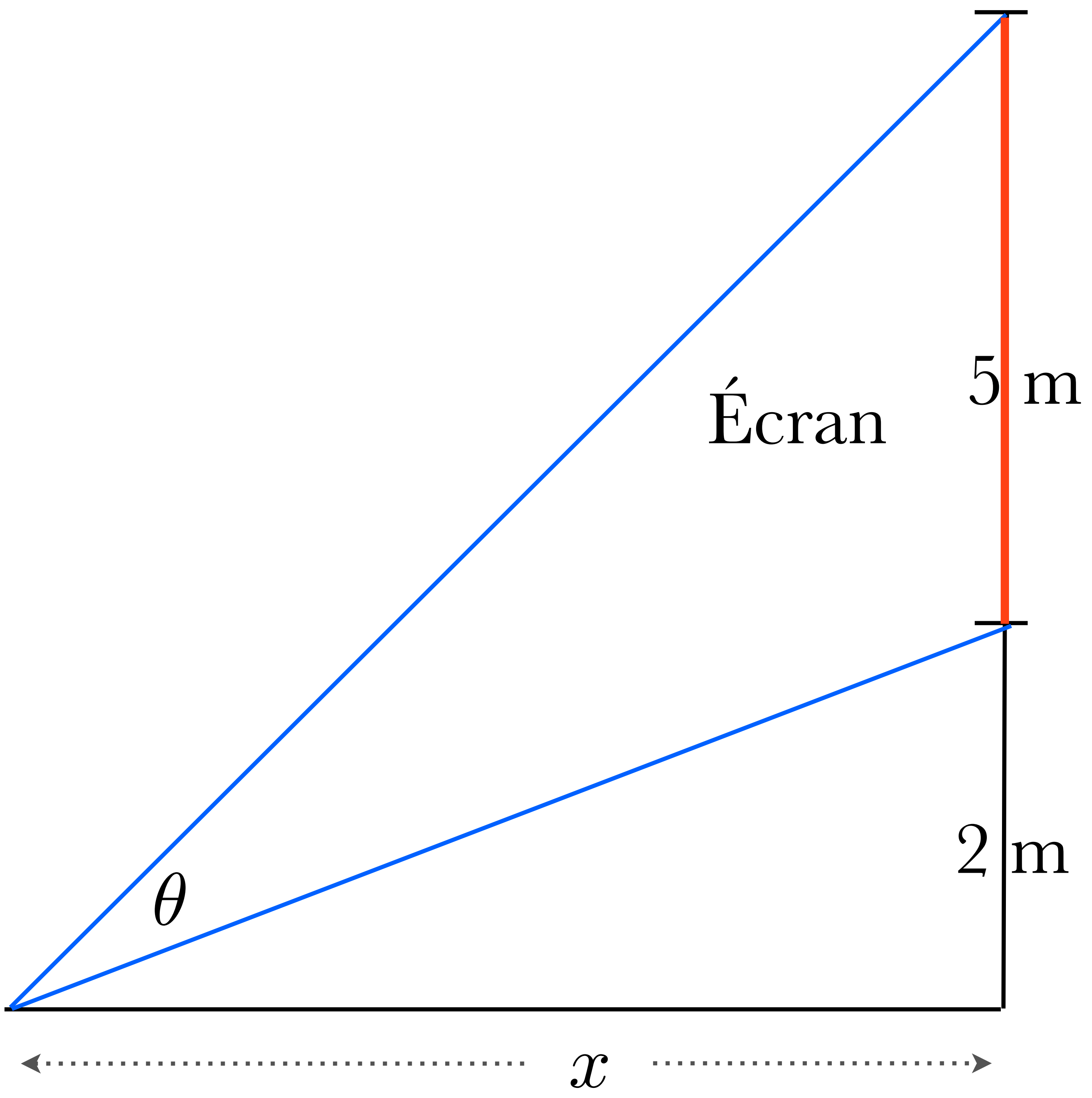
Exemple

Au cinéma:



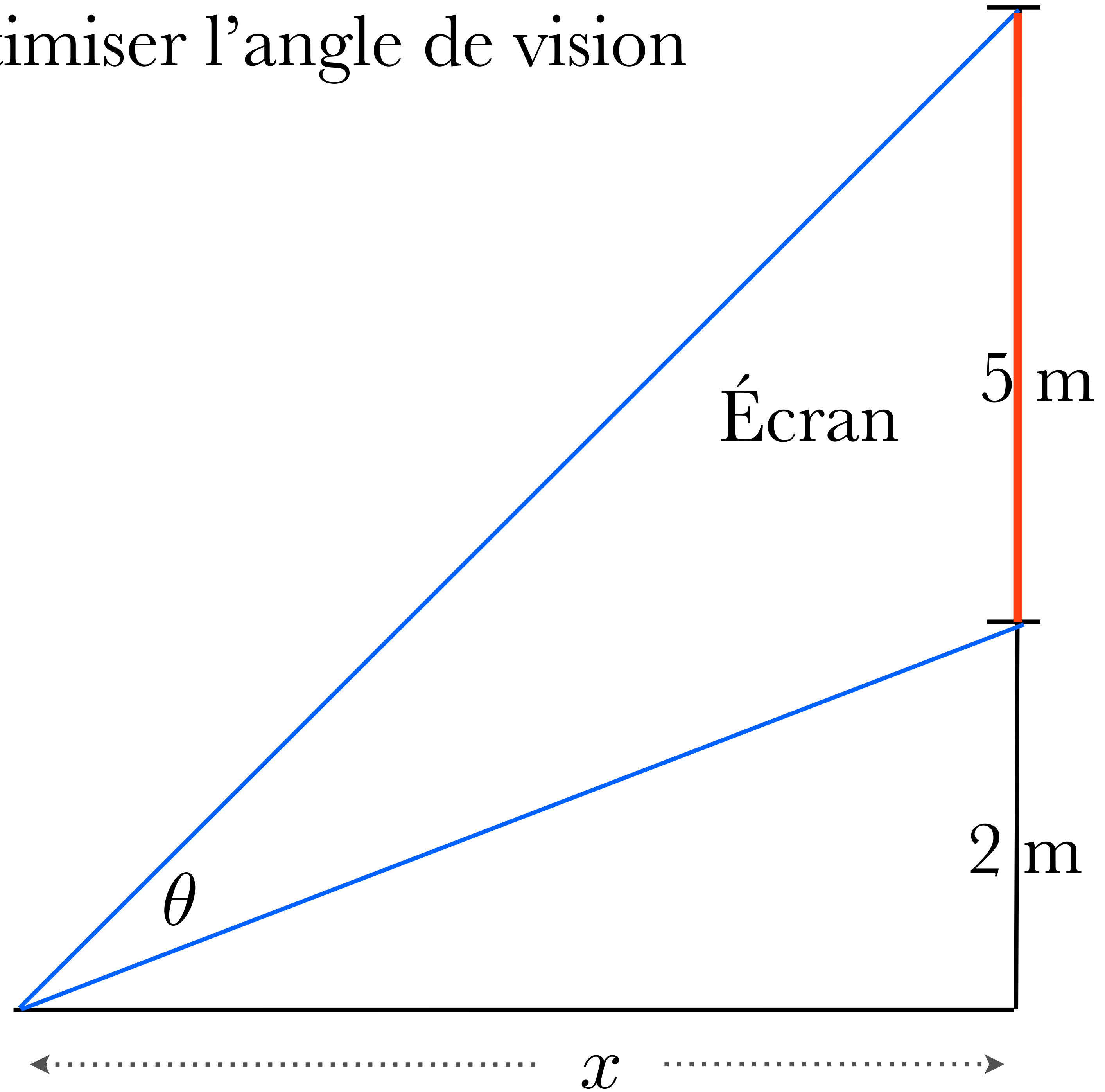
Exemple

Au cinéma:



Exemple

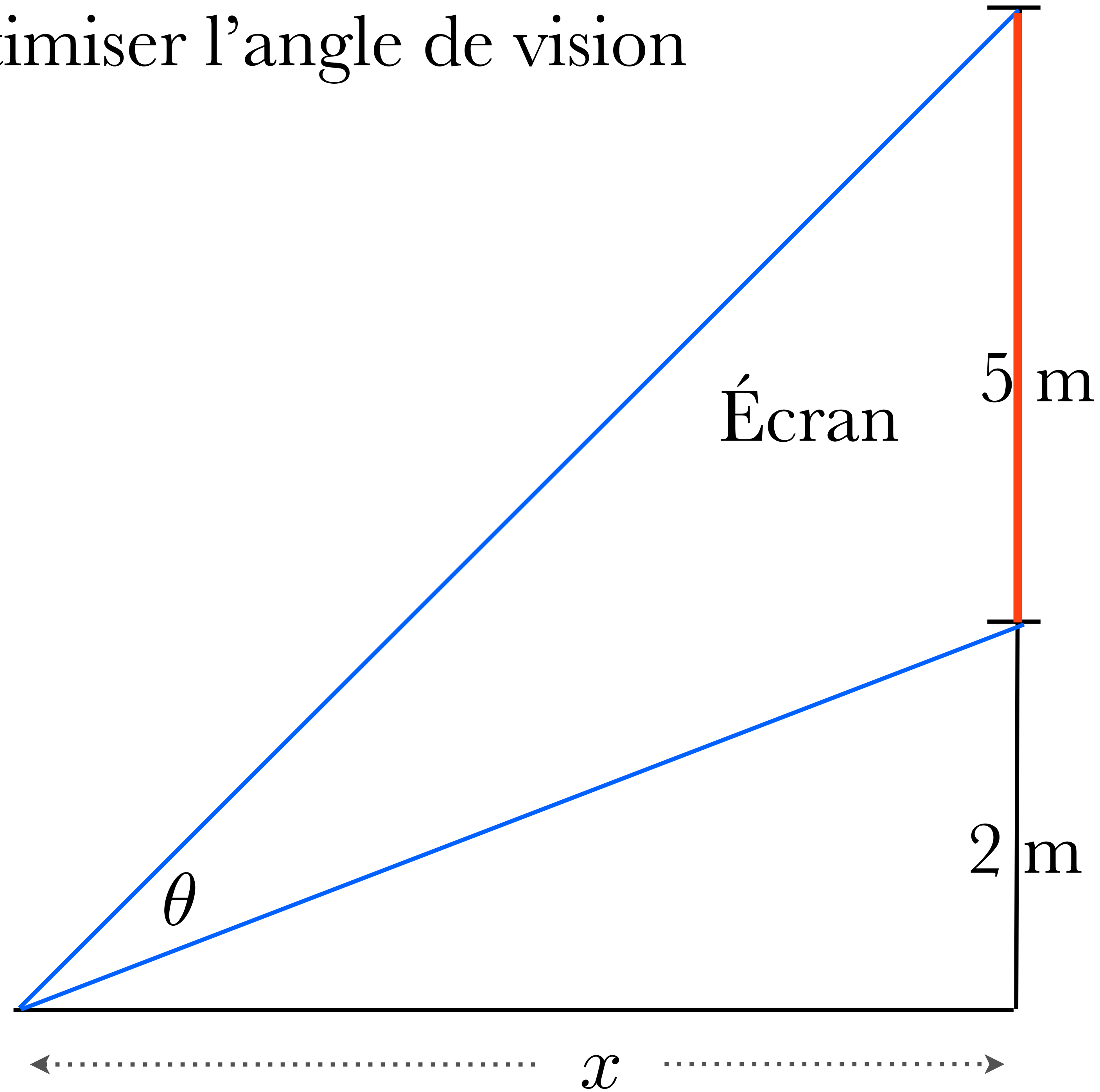
Au cinéma: optimiser l'angle de vision



Exemple

Au cinéma: optimiser l'angle de vision

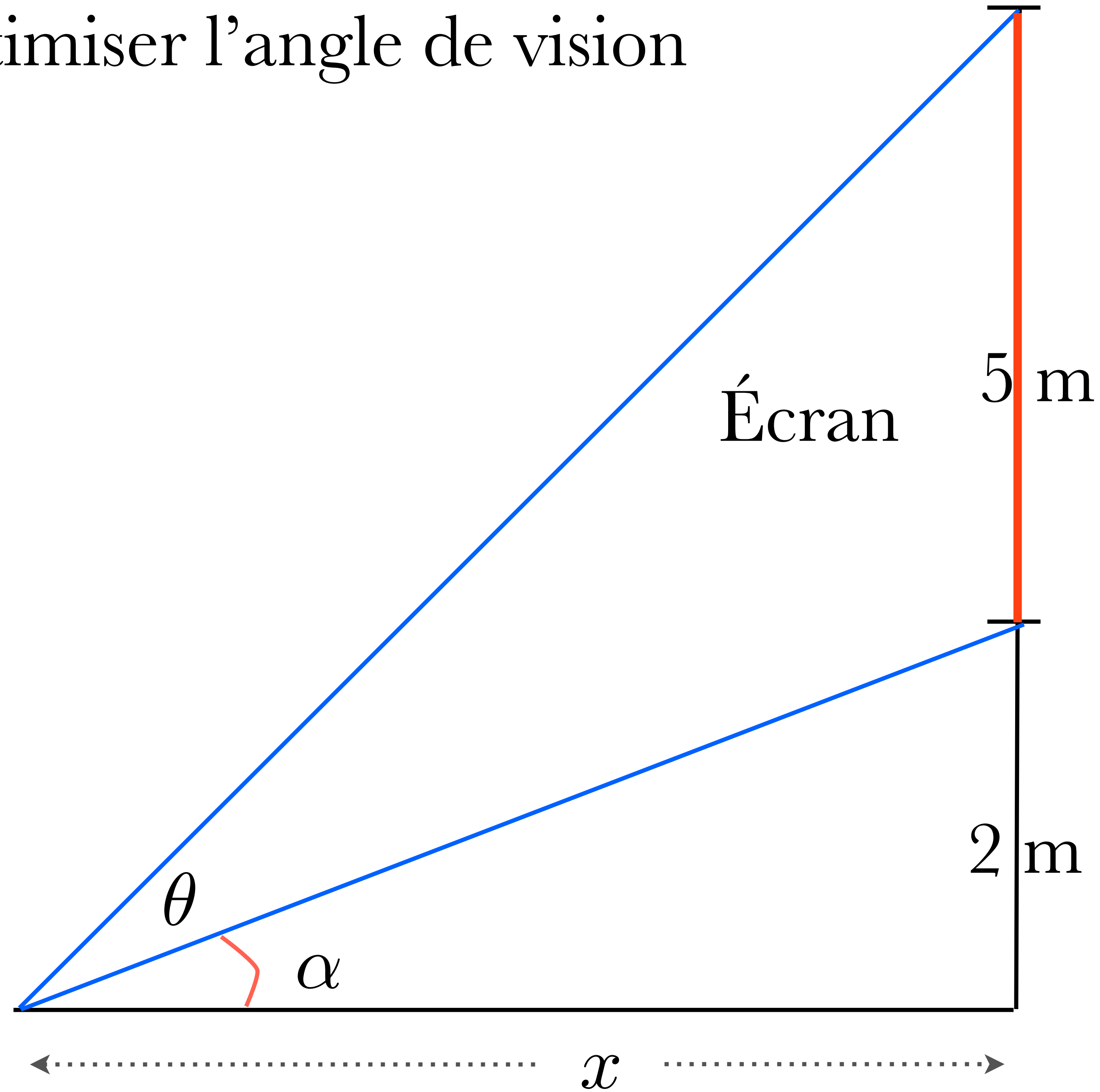
θ



Exemple

Au cinéma: optimiser l'angle de vision

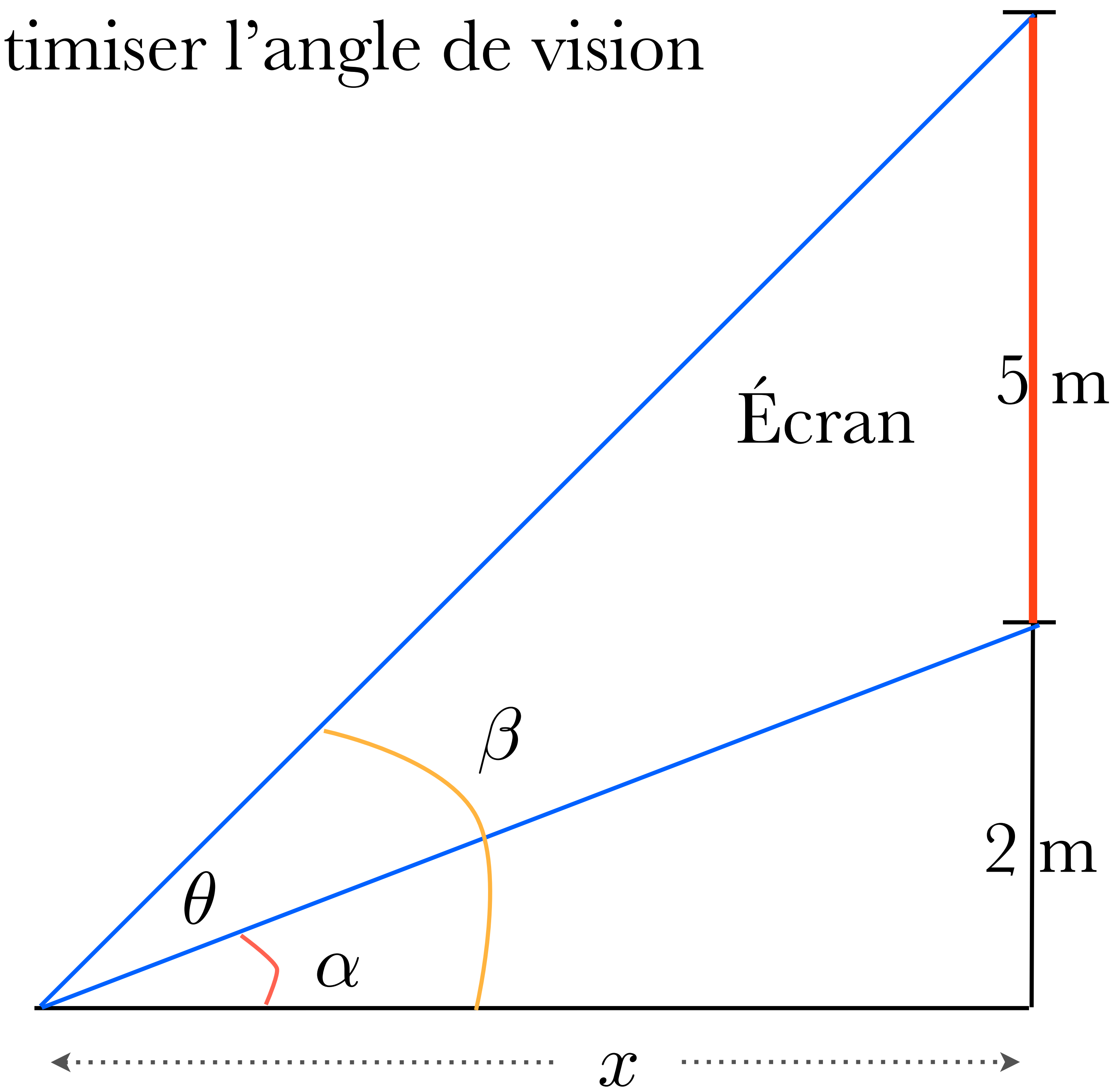
θ



Exemple

Au cinéma: optimiser l'angle de vision

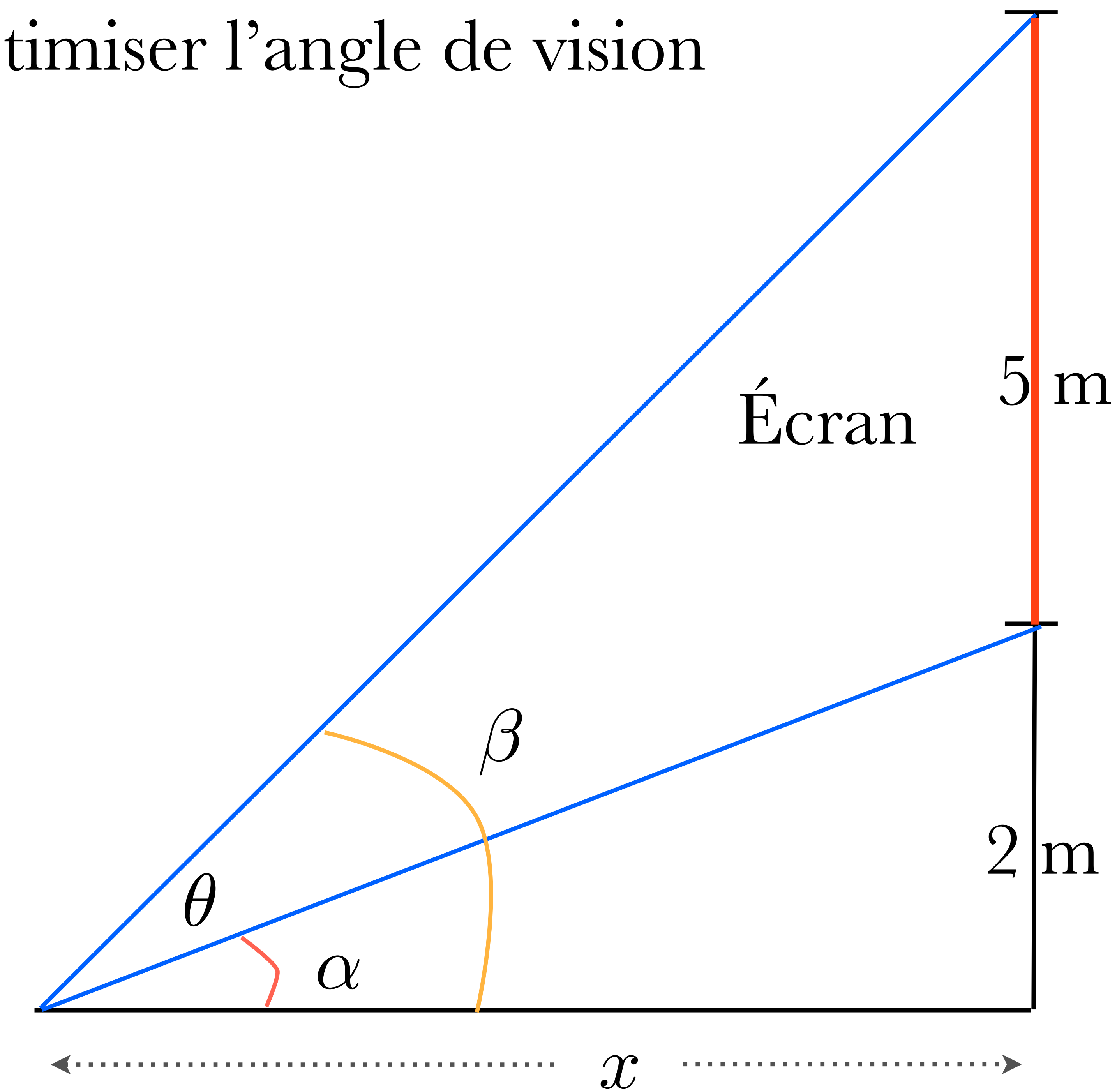
θ



Exemple

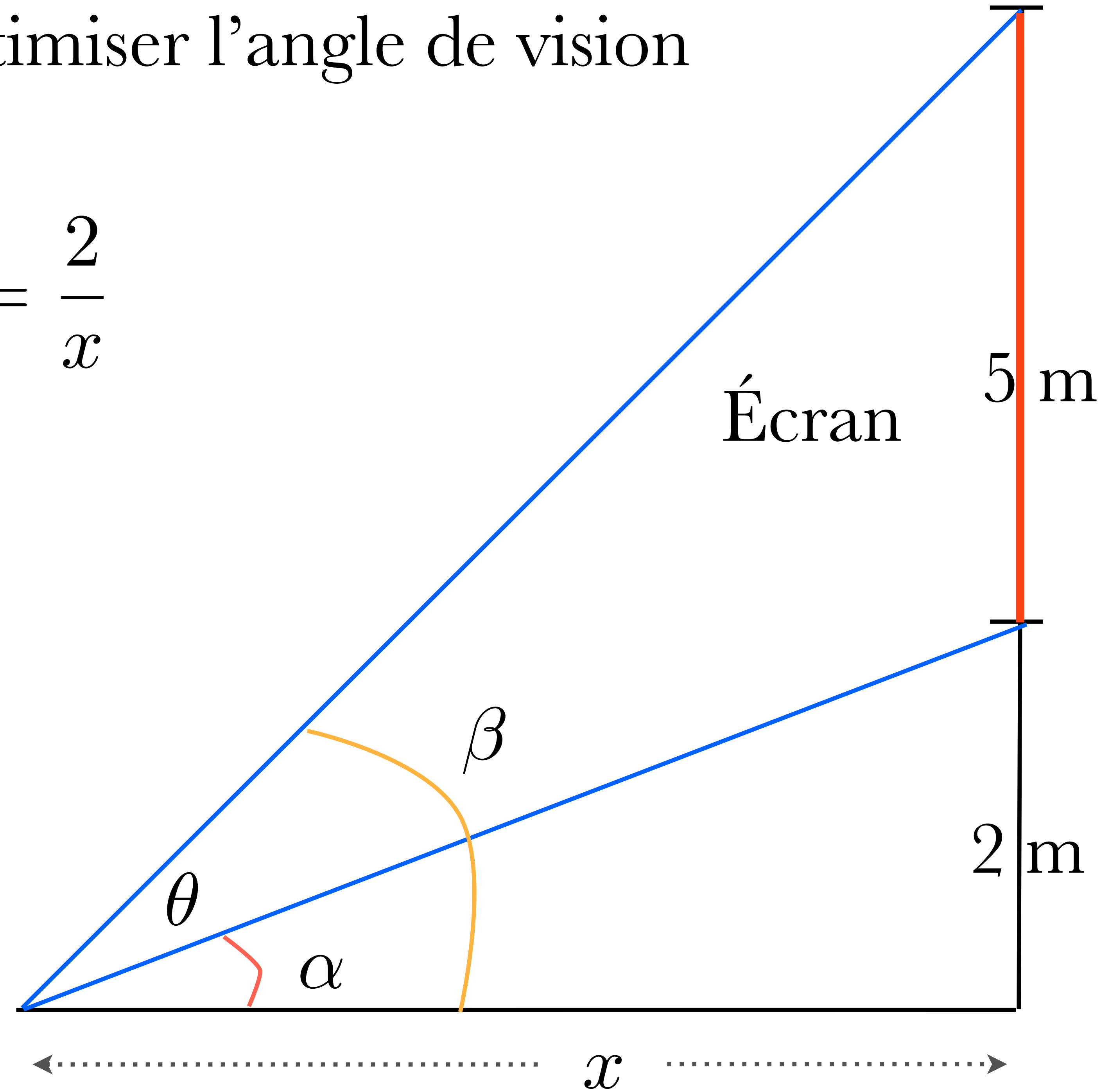
Au cinéma: optimiser l'angle de vision

$$\theta = \beta - \alpha$$



Exemple Au cinéma: optimiser l'angle de vision

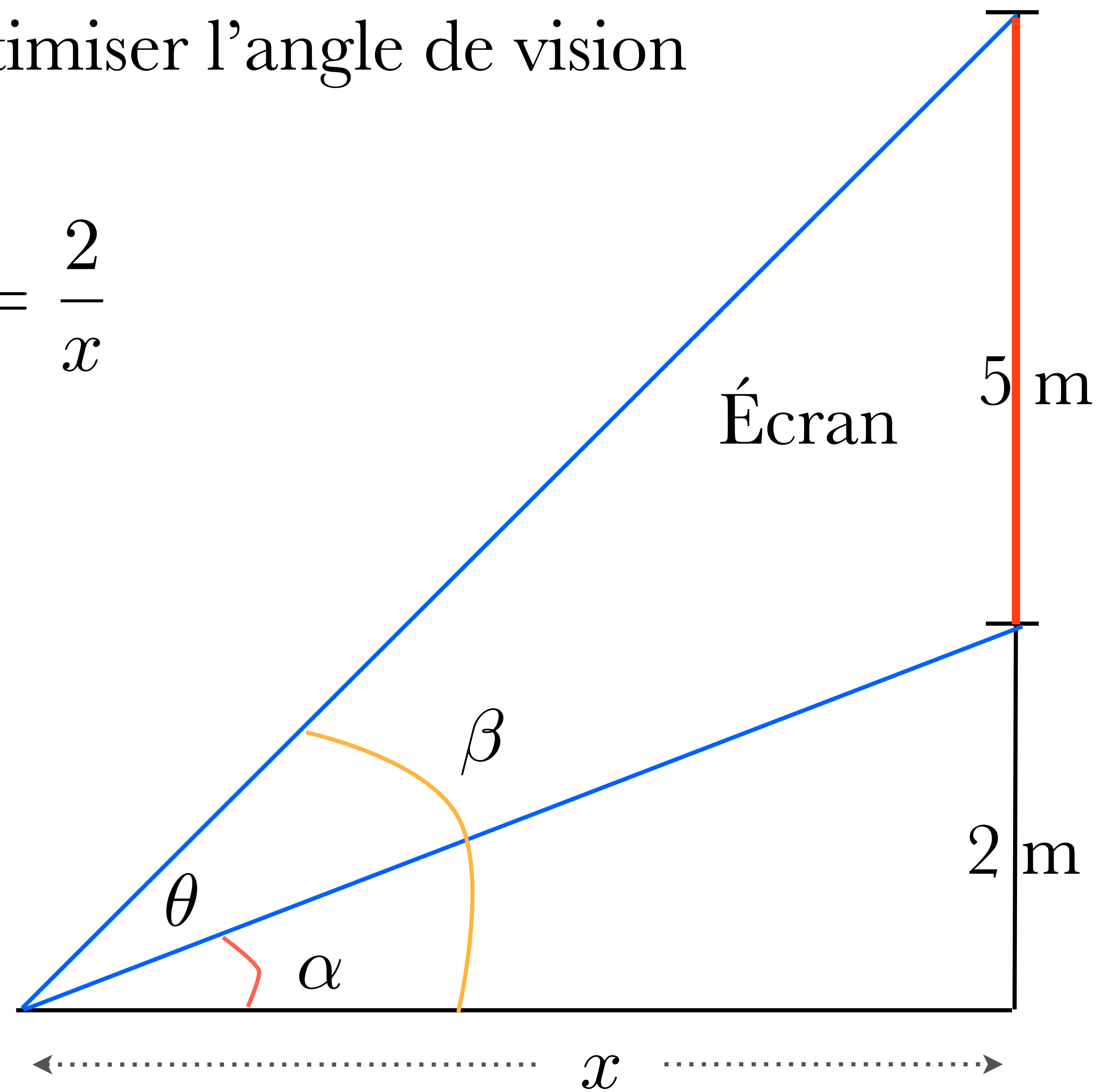
$$\theta = \beta - \alpha \qquad \tan\alpha = \frac{2}{x}$$



Exemple Au cinéma: optimiser l'angle de vision

$$\theta = \beta - \alpha \qquad \tan\alpha = \frac{2}{x}$$

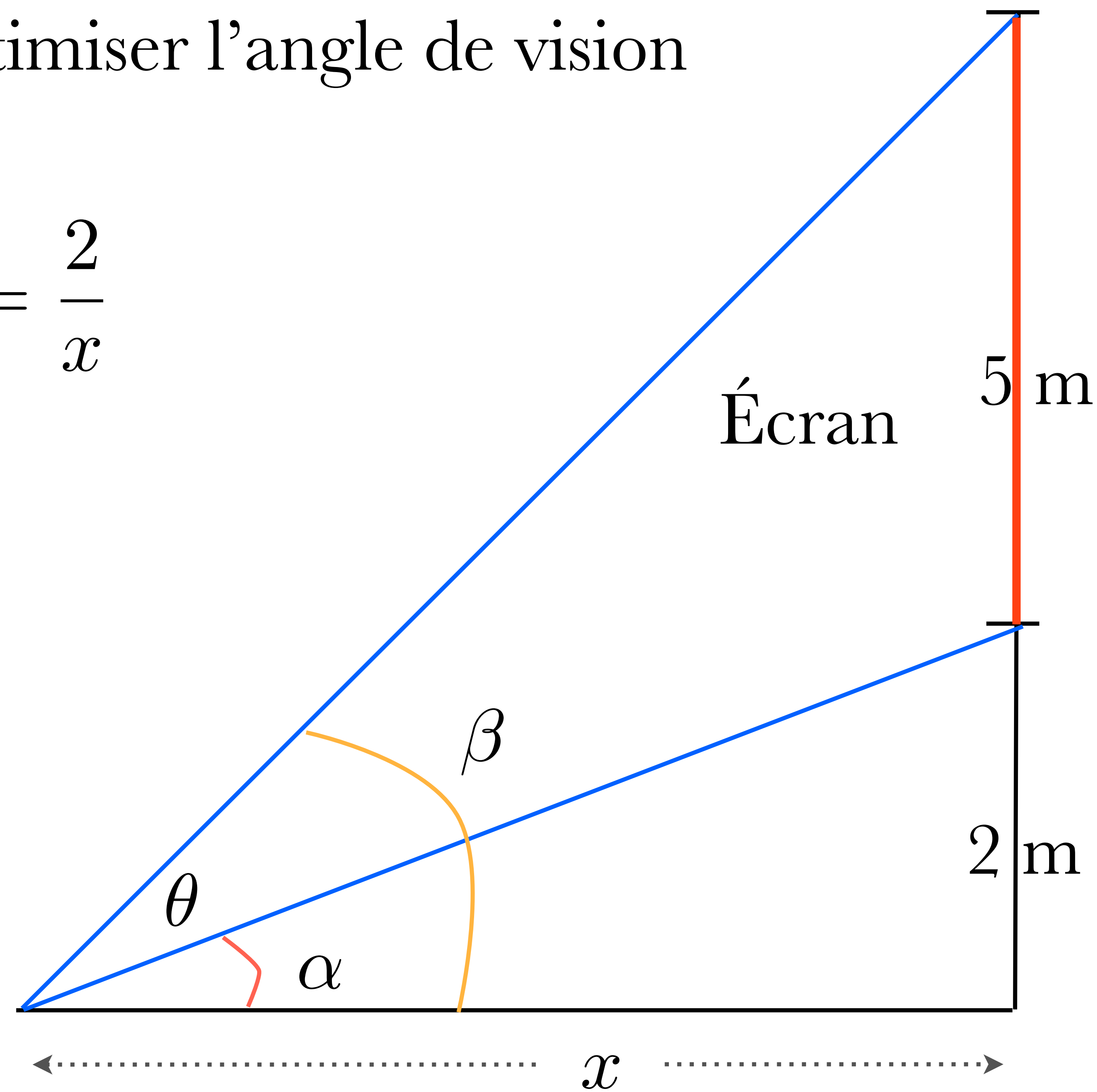
$$\cot\alpha = \frac{x}{2}$$



Exemple Au cinéma: optimiser l'angle de vision

$$\theta = \beta - \alpha \qquad \tan\alpha = \frac{2}{x}$$

$$\cot\alpha = \frac{x}{2} \qquad \alpha = \operatorname{arccot}\left(\frac{x}{2}\right)$$

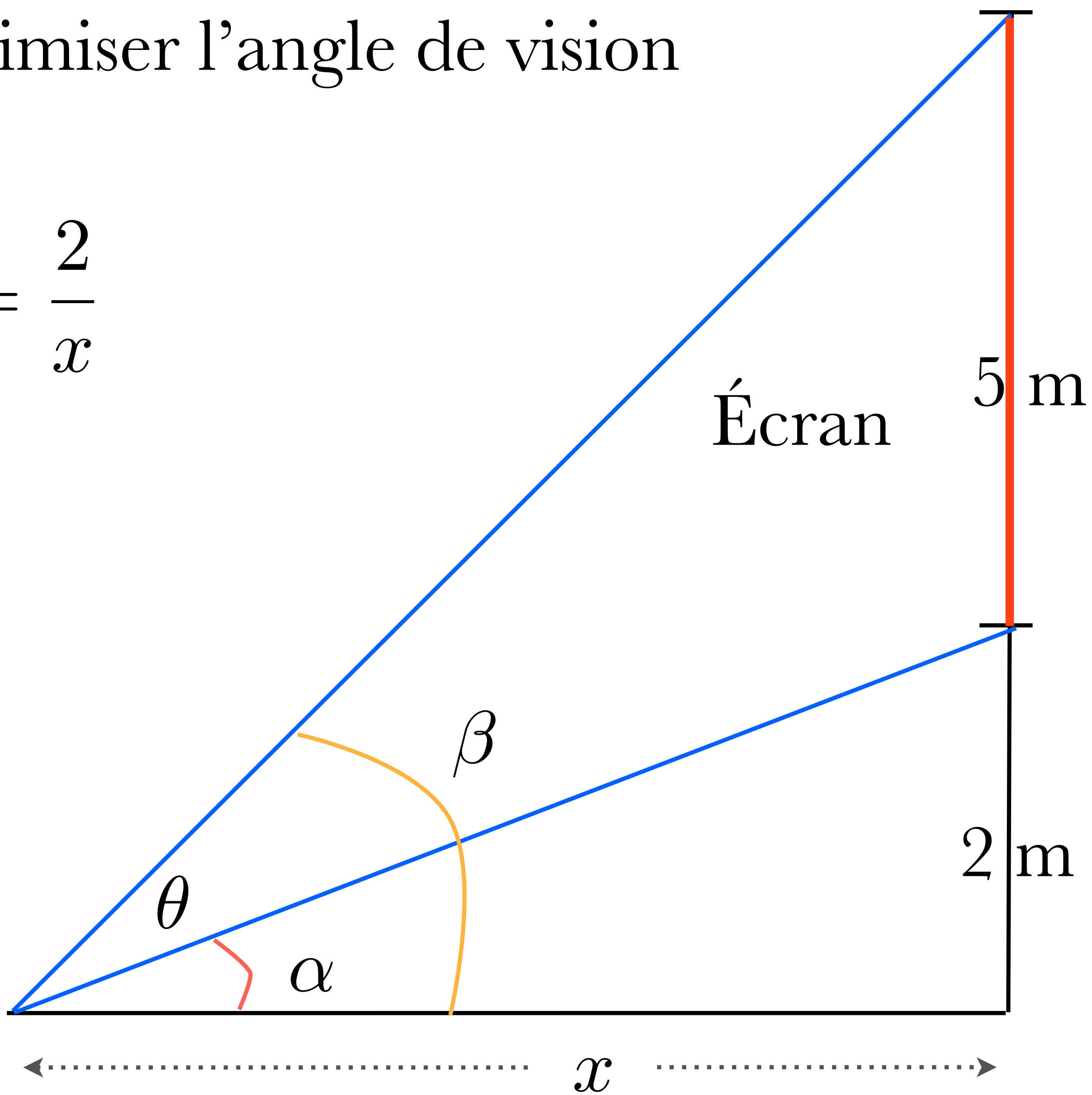


Exemple Au cinéma: optimiser l'angle de vision

$$\theta = \beta - \alpha \qquad \tan\alpha = \frac{2}{x}$$

$$\cot\alpha = \frac{x}{2} \qquad \alpha = \operatorname{arccot}\left(\frac{x}{2}\right)$$

$$\cot\beta = \frac{x}{7}$$



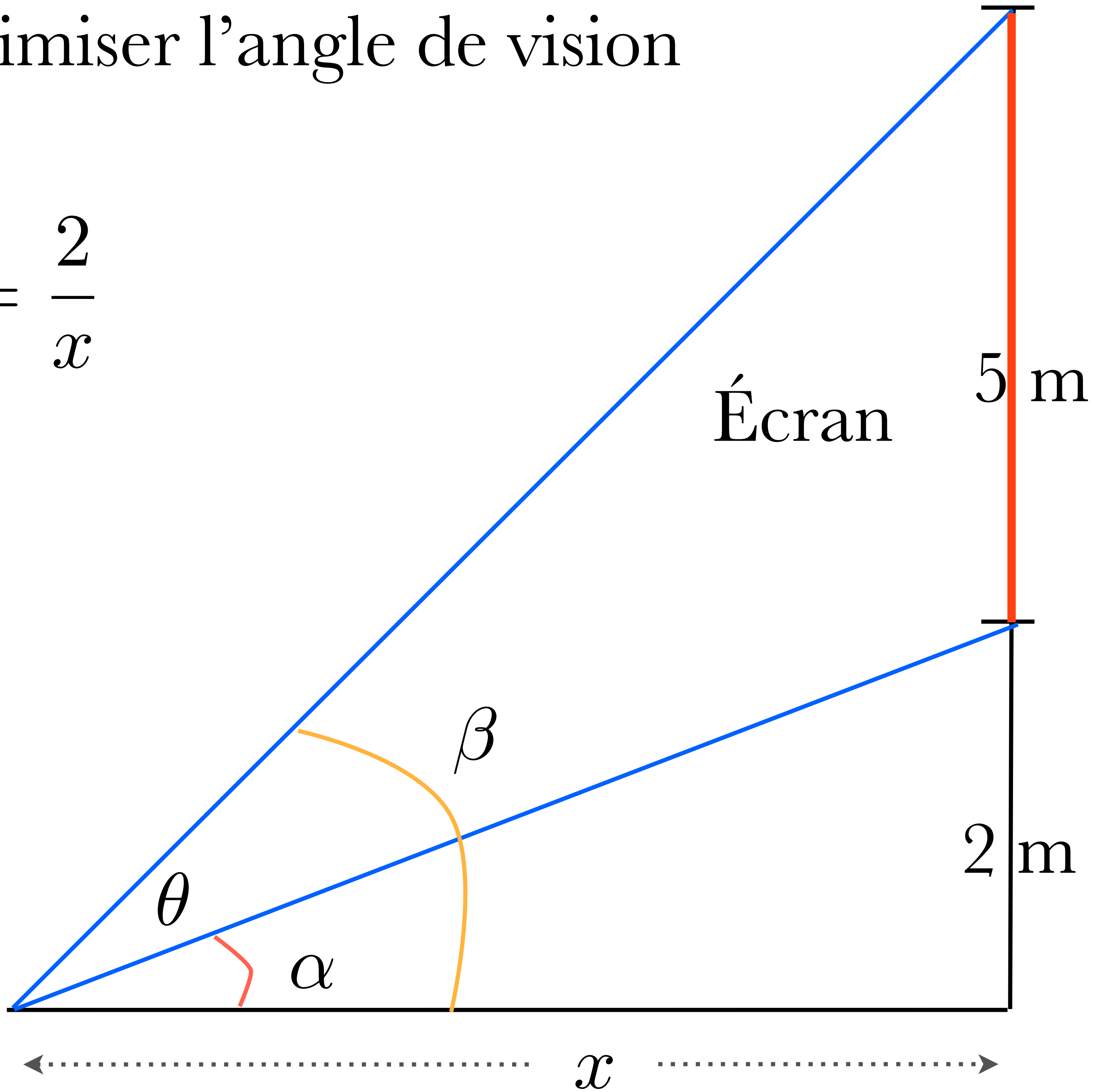
Exemple

Au cinéma: optimiser l'angle de vision

$$\theta = \beta - \alpha \qquad \tan\alpha = \frac{2}{x}$$

$$\cot\alpha = \frac{x}{2} \qquad \alpha = \operatorname{arccot}\left(\frac{x}{2}\right)$$

$$\cot\beta = \frac{x}{7} \qquad \beta = \operatorname{arccot}\left(\frac{x}{7}\right)$$



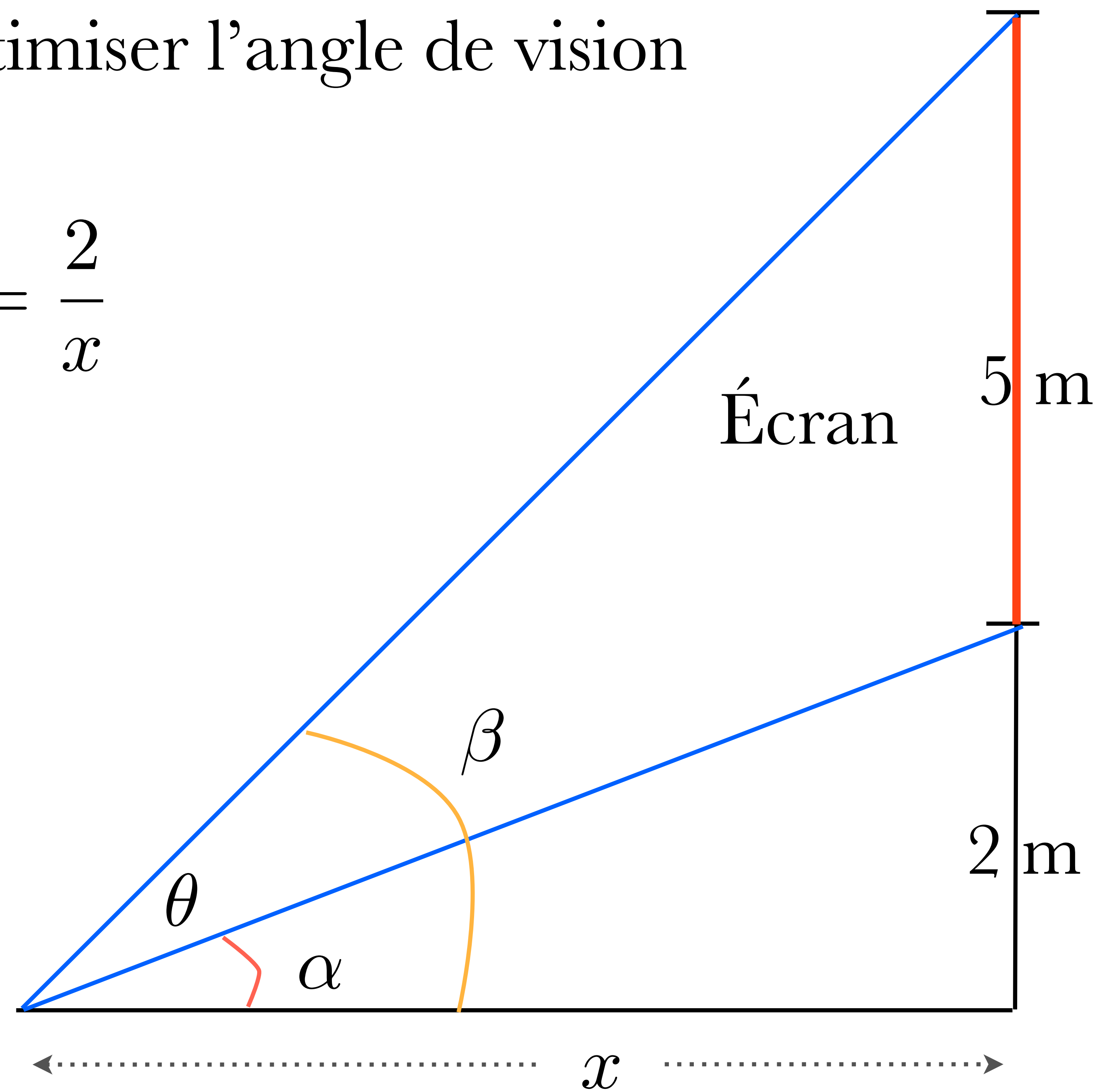
Exemple Au cinéma: optimiser l'angle de vision

$$\theta = \beta - \alpha \qquad \tan\alpha = \frac{2}{x}$$

$$\cot\alpha = \frac{x}{2} \qquad \alpha = \operatorname{arccot}\left(\frac{x}{2}\right)$$

$$\cot\beta = \frac{x}{7} \qquad \beta = \operatorname{arccot}\left(\frac{x}{7}\right)$$

$$\theta = \operatorname{arccot}\left(\frac{x}{7}\right) - \operatorname{arccot}\left(\frac{x}{2}\right)$$



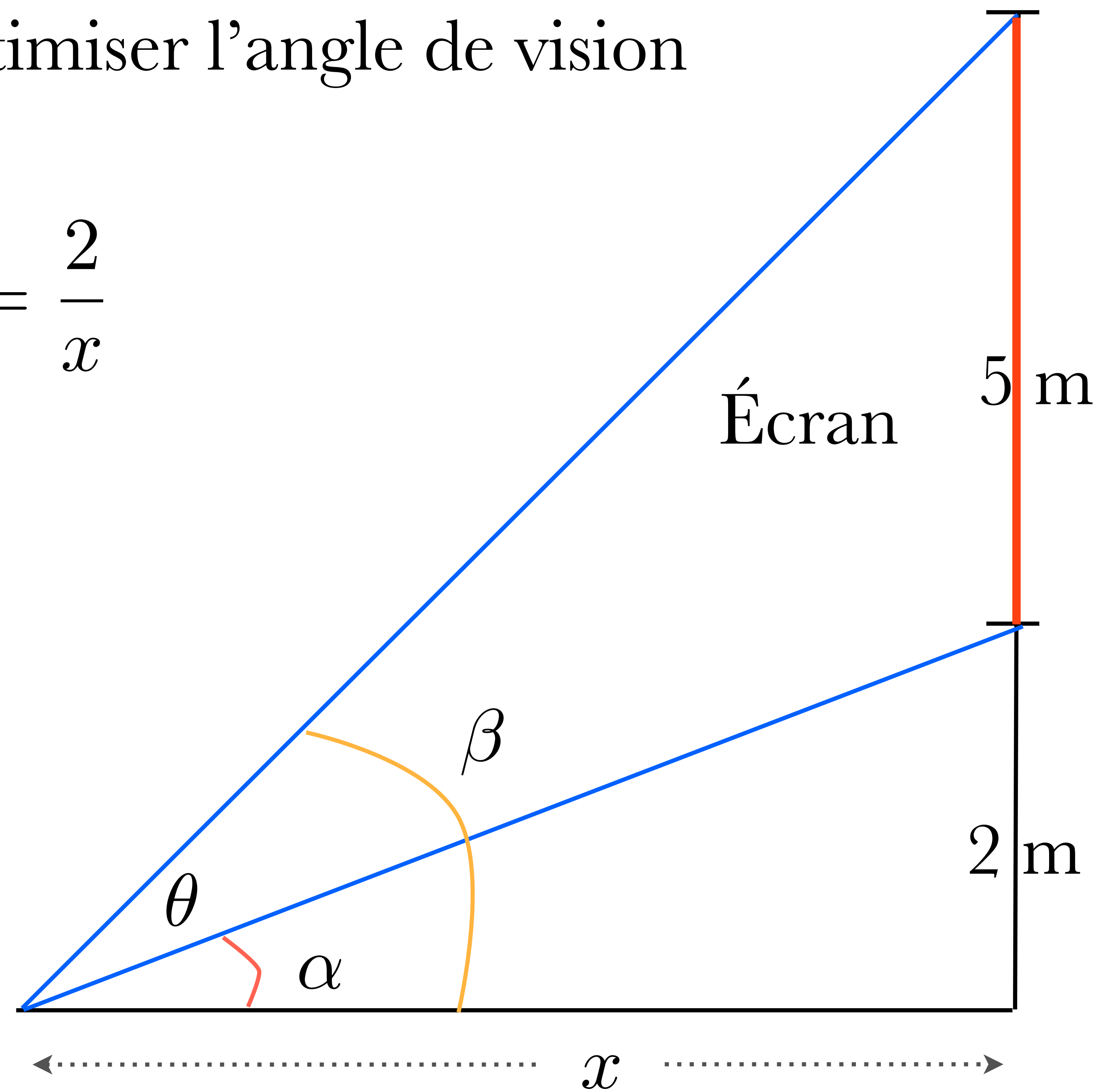
Exemple Au cinéma: optimiser l'angle de vision

$$\theta = \beta - \alpha \qquad \tan\alpha = \frac{2}{x}$$

$$\cot\alpha = \frac{x}{2} \qquad \alpha = \operatorname{arccot}\left(\frac{x}{2}\right)$$

$$\cot\beta = \frac{x}{7} \qquad \beta = \operatorname{arccot}\left(\frac{x}{7}\right)$$

$$\theta = \operatorname{arccot}\left(\frac{x}{7}\right) - \operatorname{arccot}\left(\frac{x}{2}\right)$$



$$\theta' = -\frac{\frac{1}{7}}{1+\left(\frac{x}{7}\right)^2} + \frac{\frac{1}{2}}{1+\left(\frac{x}{2}\right)^2}$$

Exemple

$$\theta' = -\frac{\frac{1}{7}}{1 + \left(\frac{x}{7}\right)^2} + \frac{\frac{1}{2}}{1 + \left(\frac{x}{2}\right)^2}$$

Exemple

$$\theta' = -\frac{\frac{1}{7}}{1+\left(\frac{x}{7}\right)^2} + \frac{\frac{1}{2}}{1+\left(\frac{x}{2}\right)^2}$$

$$= -\frac{7^2\,\frac{1}{7}}{7^2+7^2\left(\frac{x}{7}\right)^2} + \frac{2^2\,\frac{1}{2}}{2^2+2^2\left(\frac{x}{2}\right)^2}$$

Exemple

$$\theta' = -\frac{\frac{1}{7}}{1+\left(\frac{x}{7}\right)^2} + \frac{\frac{1}{2}}{1+\left(\frac{x}{2}\right)^2}$$

$$= -\frac{7^2\,\frac{1}{7}}{7^2+7^2\left(\frac{x}{7}\right)^2} + \frac{2^2\,\frac{1}{2}}{2^2+2^2\left(\frac{x}{2}\right)^2} = -\frac{7}{49+x^2} + \frac{2}{4+x^2}$$

Exemple

$$\theta' = -\frac{\frac{1}{7}}{1+\left(\frac{x}{7}\right)^2} + \frac{\frac{1}{2}}{1+\left(\frac{x}{2}\right)^2}$$

$$= -\frac{7^2\,\frac{1}{7}}{7^2+7^2\left(\frac{x}{7}\right)^2} + \frac{2^2\,\frac{1}{2}}{2^2+2^2\left(\frac{x}{2}\right)^2} = -\frac{7}{49+x^2} + \frac{2}{4+x^2}$$

$$= \frac{-7(4+x^2)+2(49+x^2)}{(49+x^2)(4+x^2)}$$

Exemple

$$\theta' = -\frac{\frac{1}{7}}{1+\left(\frac{x}{7}\right)^2} + \frac{\frac{1}{2}}{1+\left(\frac{x}{2}\right)^2}$$

$$= -\frac{7^2\,\frac{1}{7}}{7^2+7^2\left(\frac{x}{7}\right)^2} + \frac{2^2\,\frac{1}{2}}{2^2+2^2\left(\frac{x}{2}\right)^2} = -\frac{7}{49+x^2} + \frac{2}{4+x^2}$$

$$= \frac{-7(4+x^2)+2(49+x^2)}{(49+x^2)(4+x^2)} = \frac{-7x^2-28+2x^2+98}{(49+x^2)(4+x^2)}$$

Exemple

$$\theta' = -\frac{\frac{1}{7}}{1+\left(\frac{x}{7}\right)^2} + \frac{\frac{1}{2}}{1+\left(\frac{x}{2}\right)^2}$$

$$= -\frac{7^2\,\frac{1}{7}}{7^2+7^2\left(\frac{x}{7}\right)^2} + \frac{2^2\,\frac{1}{2}}{2^2+2^2\left(\frac{x}{2}\right)^2} = -\frac{7}{49+x^2} + \frac{2}{4+x^2}$$

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$$= \frac{-5x^2+70}{(49+x^2)(4+x^2)}$$

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	0		$\sqrt{14}$	
$\theta'(x)$		$+$		$-$

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Aujourd'hui, nous avons vu

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$$(\mathrm{arcsec}\, x)' = \frac{1}{x\sqrt{x^2-1}} \qquad (\mathrm{arccsc}\, x)' = \frac{-1}{x\sqrt{x^2-1}}$$

Devoir: # 9 à 14

et

#25, 27 à 30