

## Ângulo de Antonio Vandr .

Sejam  $P(a, b)$ ,  $Q(c, d)$ , o eixo  $\overrightarrow{PQ}$ , e uma fun  o  $f : I \rightarrow \mathbb{R}$ . O  ngulo  $\theta$  de um ponto de  $f$  com o eixo  $\overrightarrow{PQ}$    tal que

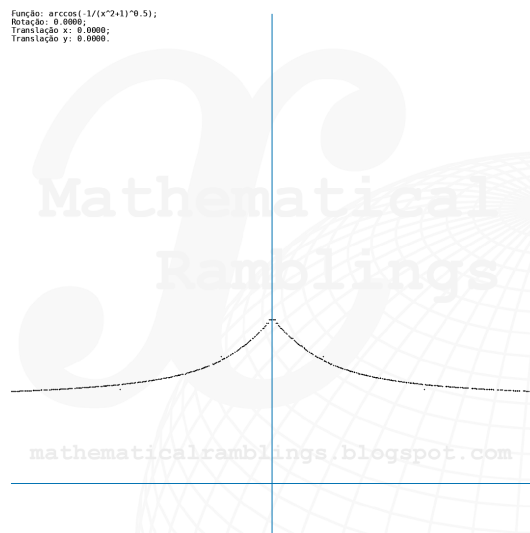
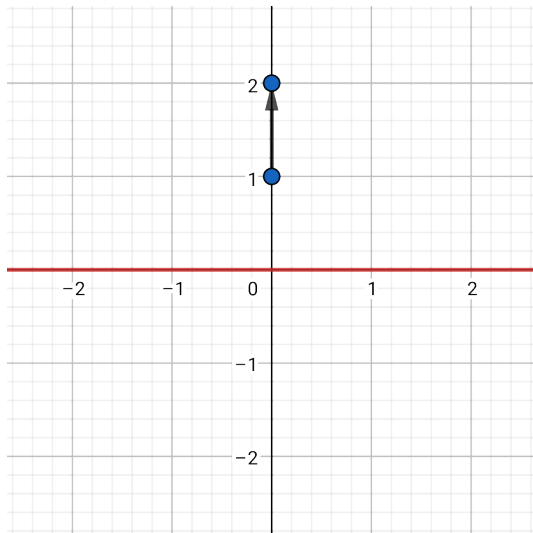
$$\cos \theta = \frac{(c-a)(x-a) + (d-b)[f(x)-b]}{\sqrt{[(c-a)^2 + (d-b)^2]\{(x-a)^2 + [f(x)-b]^2\}}}.$$

Chamando tal  ngulo de  ngulo de Antonio Vandr ,

$$\alpha_{\mathcal{A}_{f(x)}}^{[(a,b),(c,d)]} = \arccos \frac{(c-a)(x-a) + (d-b)[f(x)-b]}{\sqrt{[(c-a)^2 + (d-b)^2]\{(x-a)^2 + [f(x)-b]^2\}}}.$$


Exemplo:  $f(x) = 0$ ,  $P(0, 1)$ ,  $Q(0, 2)$ :

$$\alpha_{\mathcal{A}_0}^{[(0,1),(0,2)]} = \arccos \frac{-1}{\sqrt{x^2 + 1}}.$$



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