UCS
UNIVERSIDADE
DE CAXIAS DO SUL

Tópicos de Ciências Exatas

ÁREA DO CONHECIMENTO DE CIÊNCIAS EXATAS E ENGENHARIAS

2024/2

FUNDAÇÃO UNIVERSIDADE
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Aula 16
Trigonometria Básica

Notas de Aula – p. 33

FUNDAÇÃO UNIVERSIDADE
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Funções Trigonométricas

Fenômenos Ciências Exatas

Modelos Periódicos

Funções Circulares

Funções Trigonométricas

Básicas e Transformações

Circunferência Trigonométrica

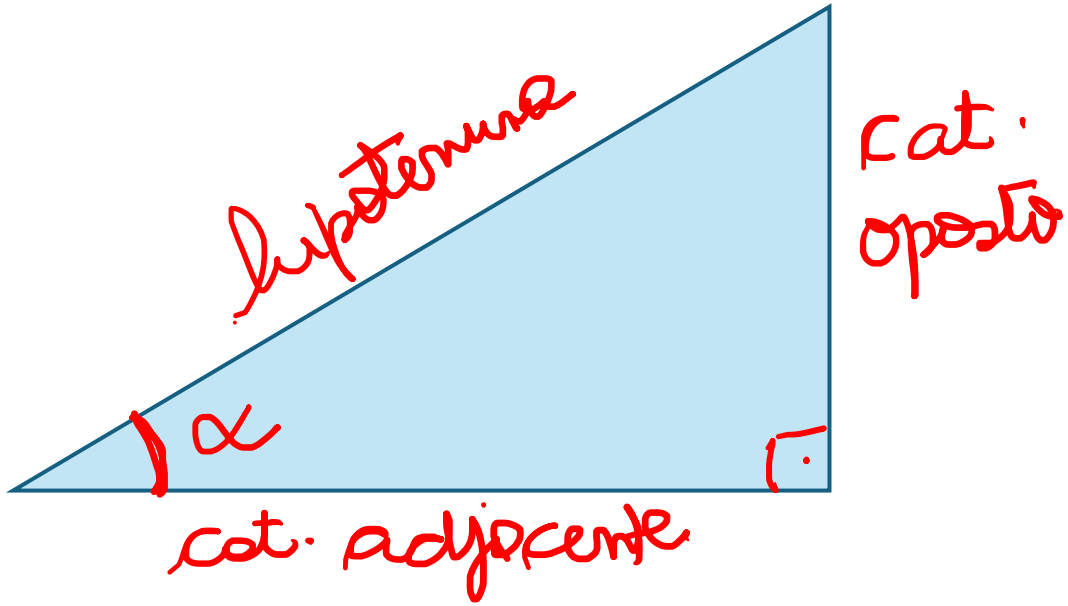
Triângulo retângulo

Triângulo Retângulo

Definição

Elementos

Para que usamos?



Razões Trigonométricas no Triângulo Retângulo

$$\operatorname{sen}\alpha = \frac{\text{cat. oposto}}{\text{hipotenusa}}$$

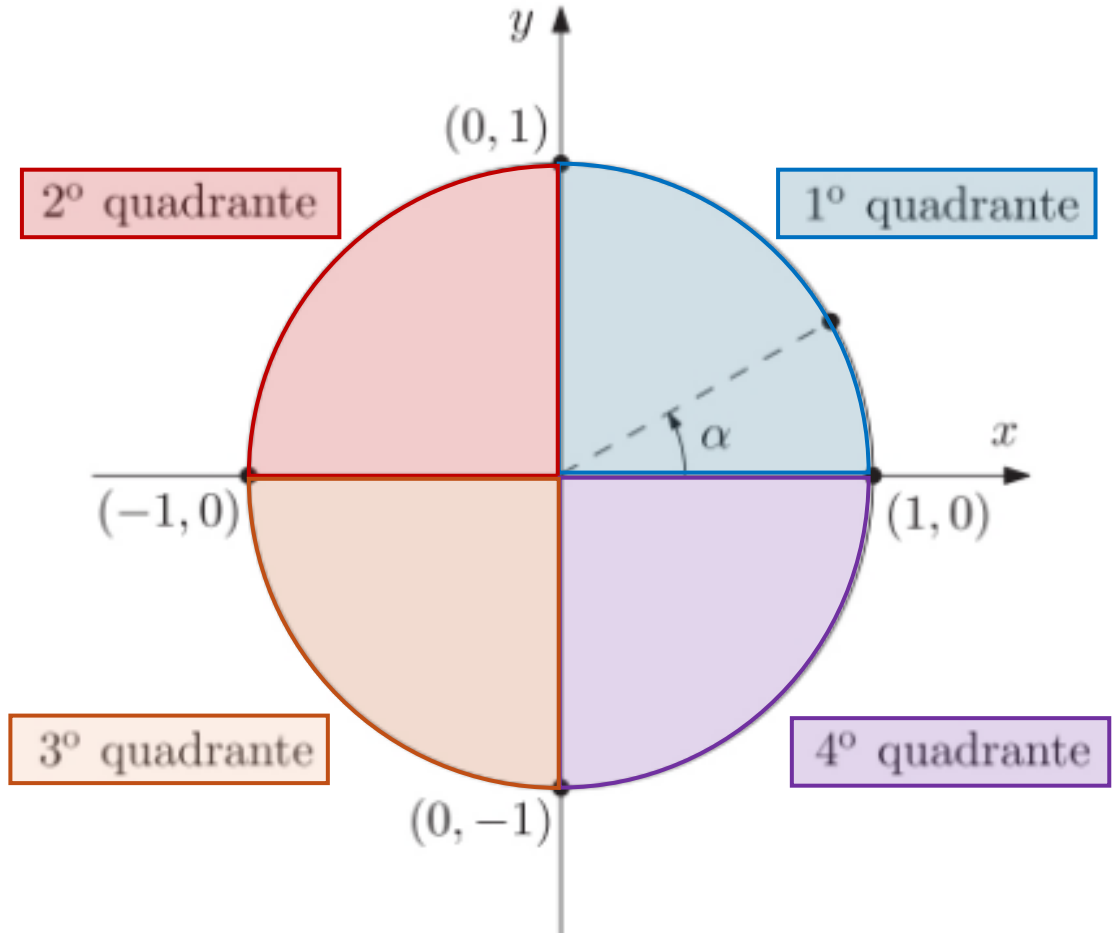
$$\cos\alpha = \frac{\text{cat. adjacente}}{\text{hipotenusa}}$$

$$\tan\alpha = \frac{\text{cat. oposto}}{\text{cat. adjacente}}$$

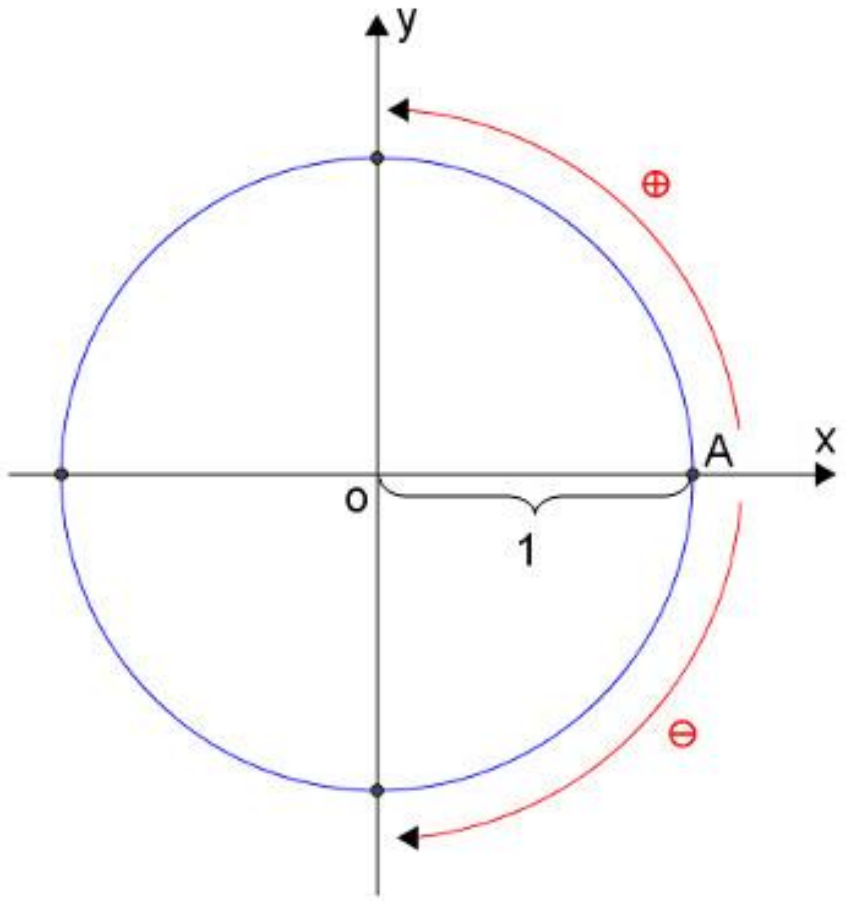
Ainda:
$\cot\alpha$, $\sec x$, $\operatorname{cossec} x$

α	$30°$	$45°$	$60°$
$\operatorname{sen}(\alpha)$	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$
$\cos(\alpha)$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$
$\operatorname{tg}(\alpha)$	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$

Circunferência Trigonométrica



Medindo Arcos na Circunferência Trigonométrica



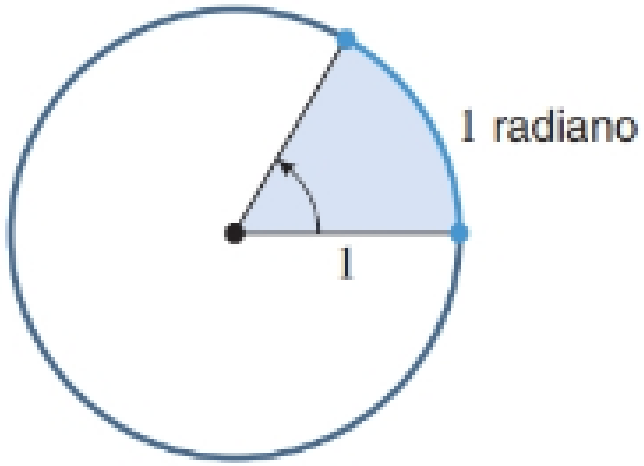
Unidades de Medidas

$$1 \text{ Grau} = 1° = \frac{1}{360} C$$

sendo $C = 2\pi r$ comprimento da circunferência

$$1 \text{ Radiano} = 1 \text{ rad} = \alpha$$

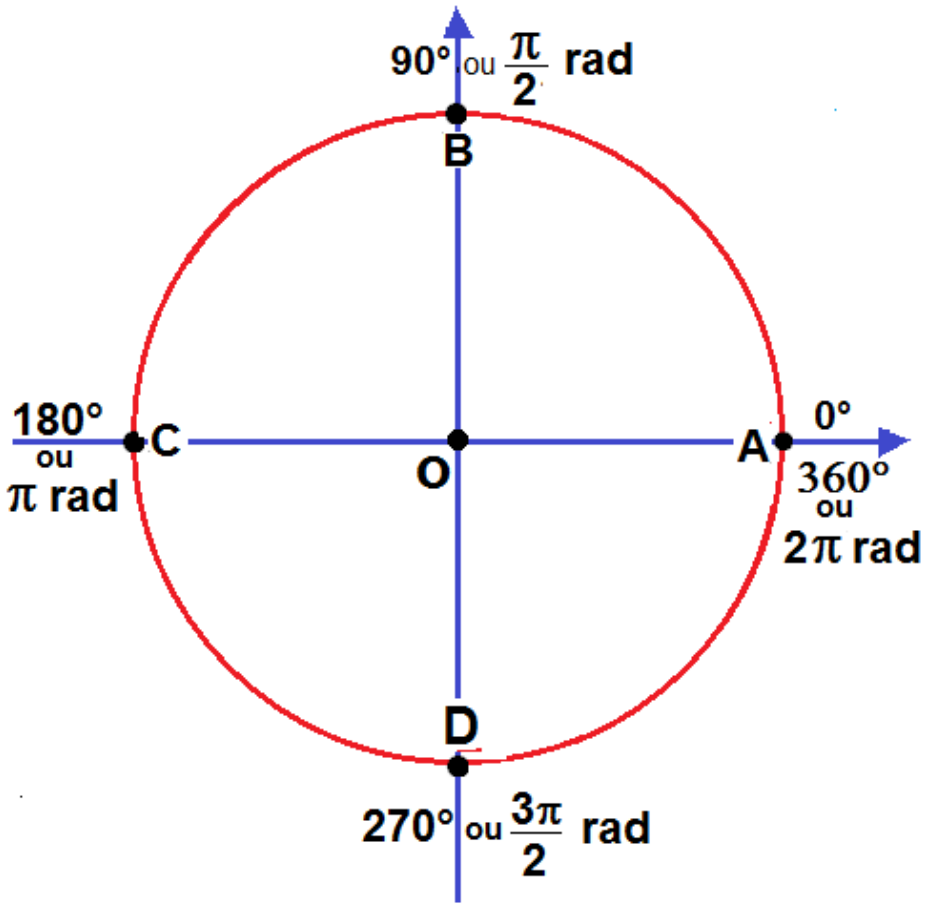
sendo α definido pelo arco de comprimento equivalente ao raio da circunferência (clique aqui)



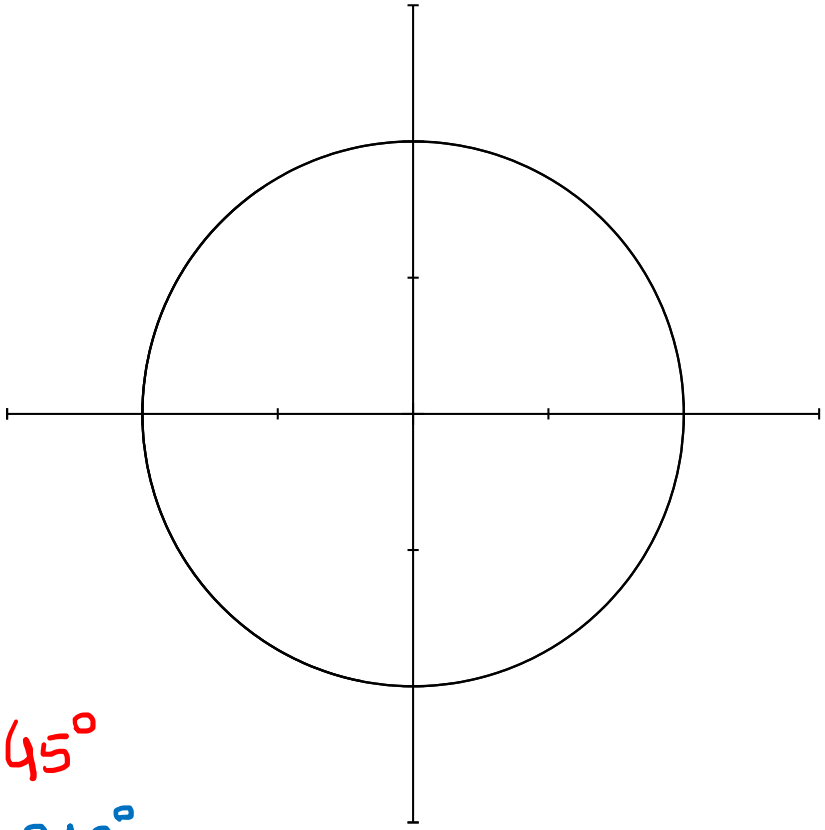
- ✓A circunferência completa corresponde ao ângulo de $360°$ ou 2π radianos.

- ✓A metade da circunferência corresponde ao ângulo de $180°$ ou π radianos.

Relação entre Radianos e Graus



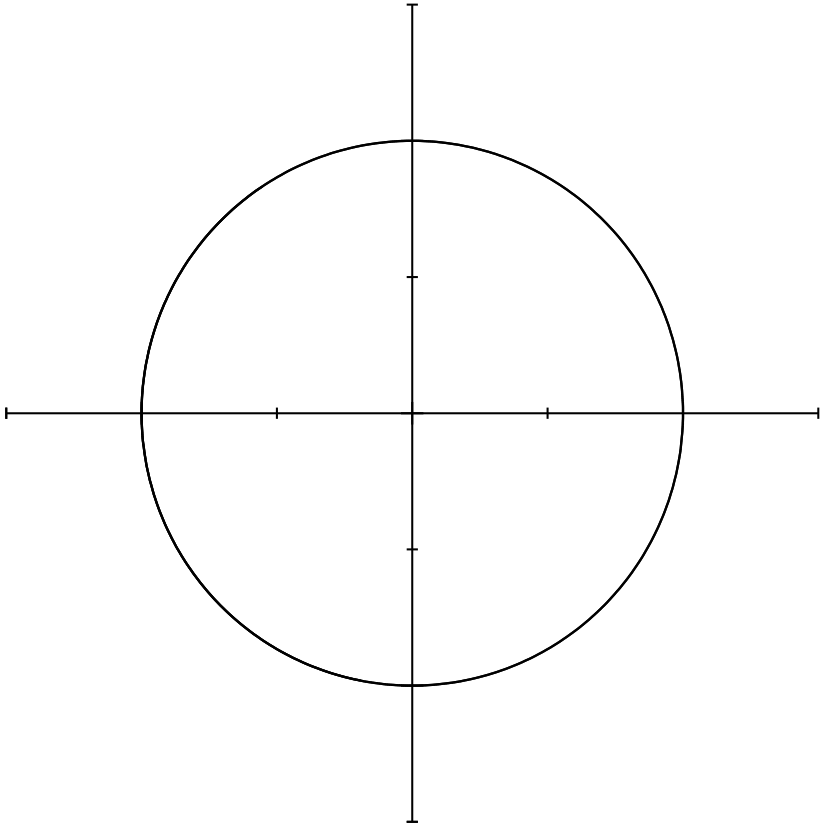
Exemplos



$\alpha_1 = 45^\circ$

$\alpha_2 = 210^\circ$

$\alpha_3 = 450^\circ$



$\beta_1 = \pi/6$

$\beta_2 = \frac{7\pi}{4}$

$\beta_3 = -\pi/2$

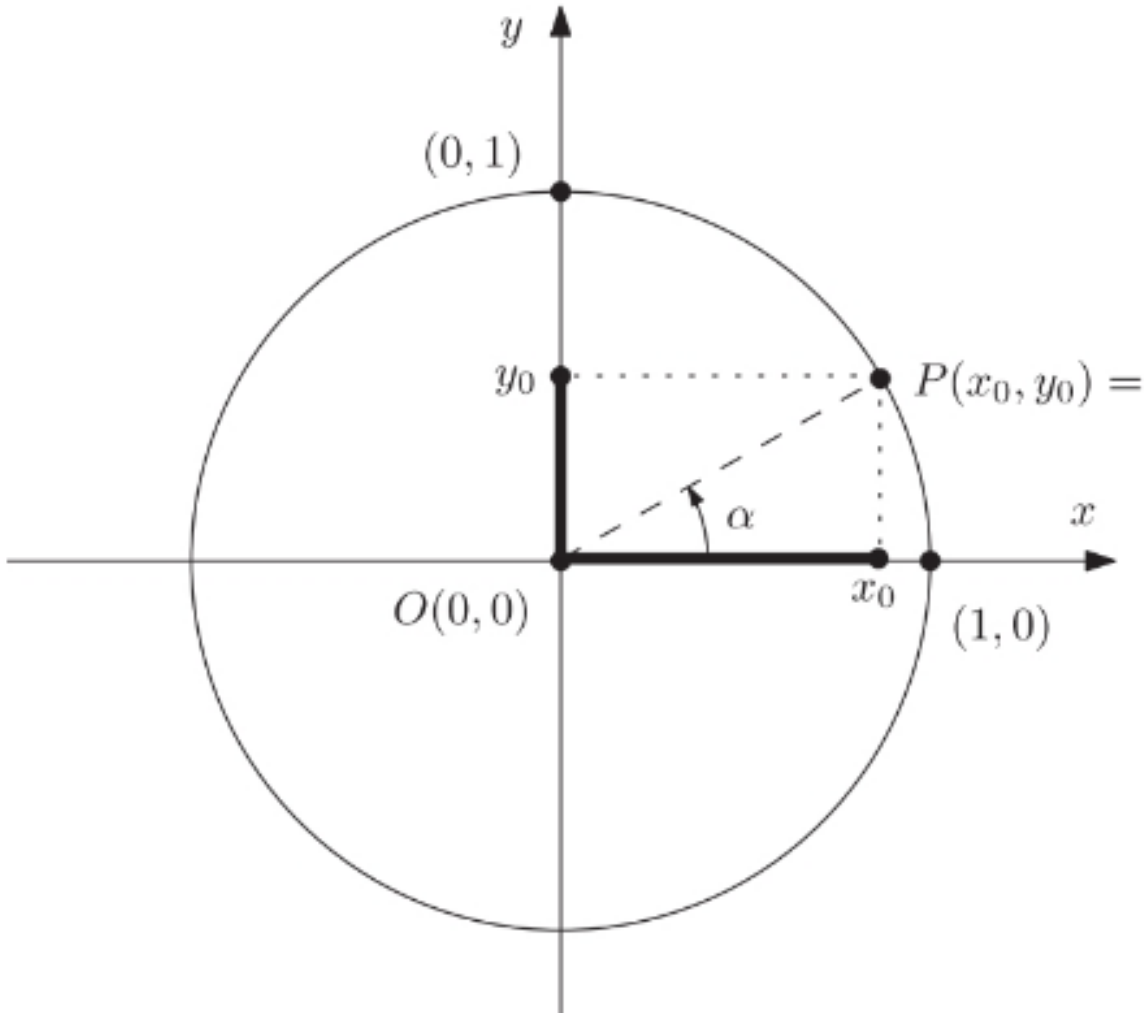
Atividades da Aula 15 – Parte I

Notas de Aula, p. 33

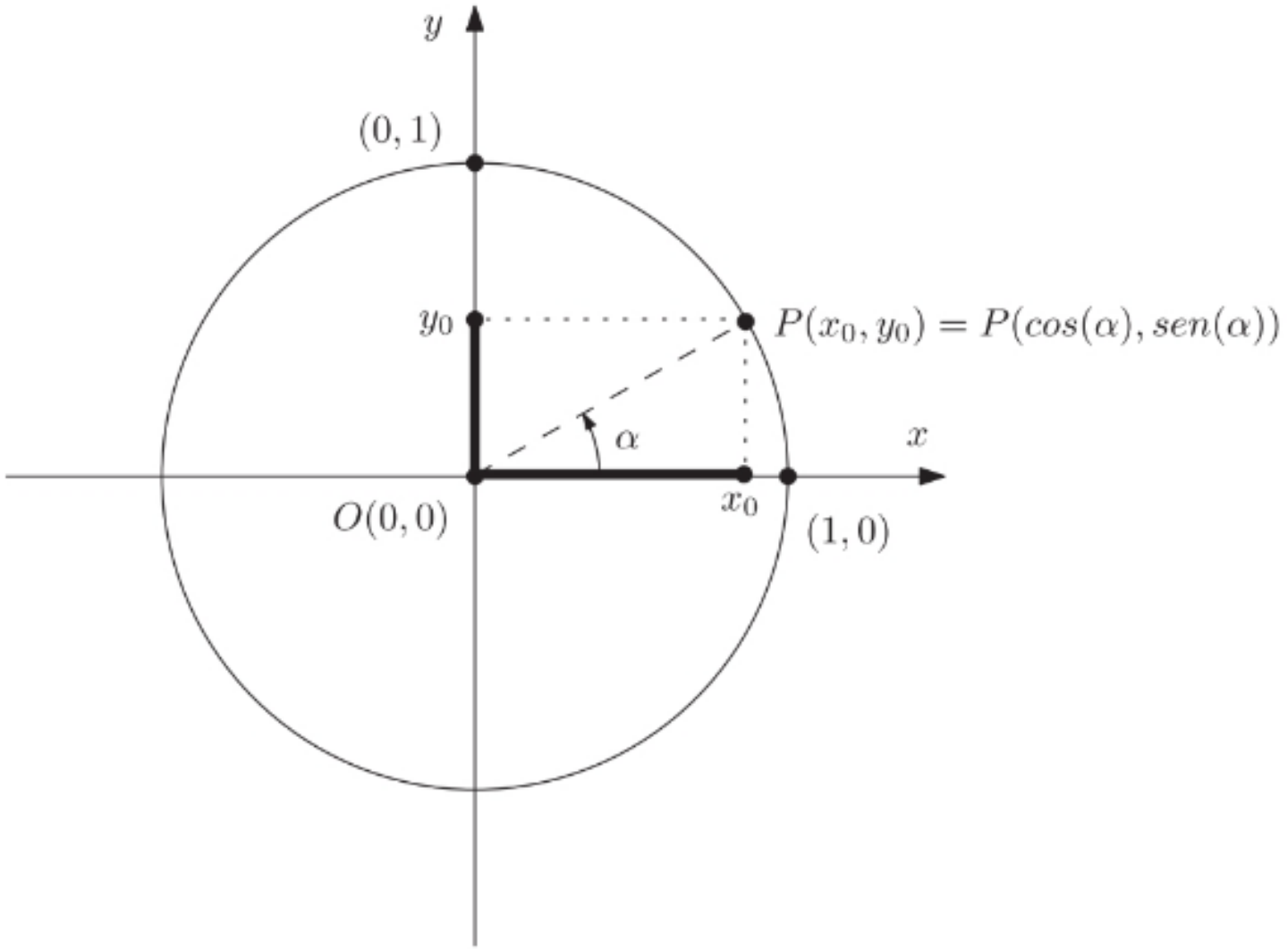
Leitura do texto introdutório, completando as lacunas

Atividades 01, 02, 03, 04 e 05

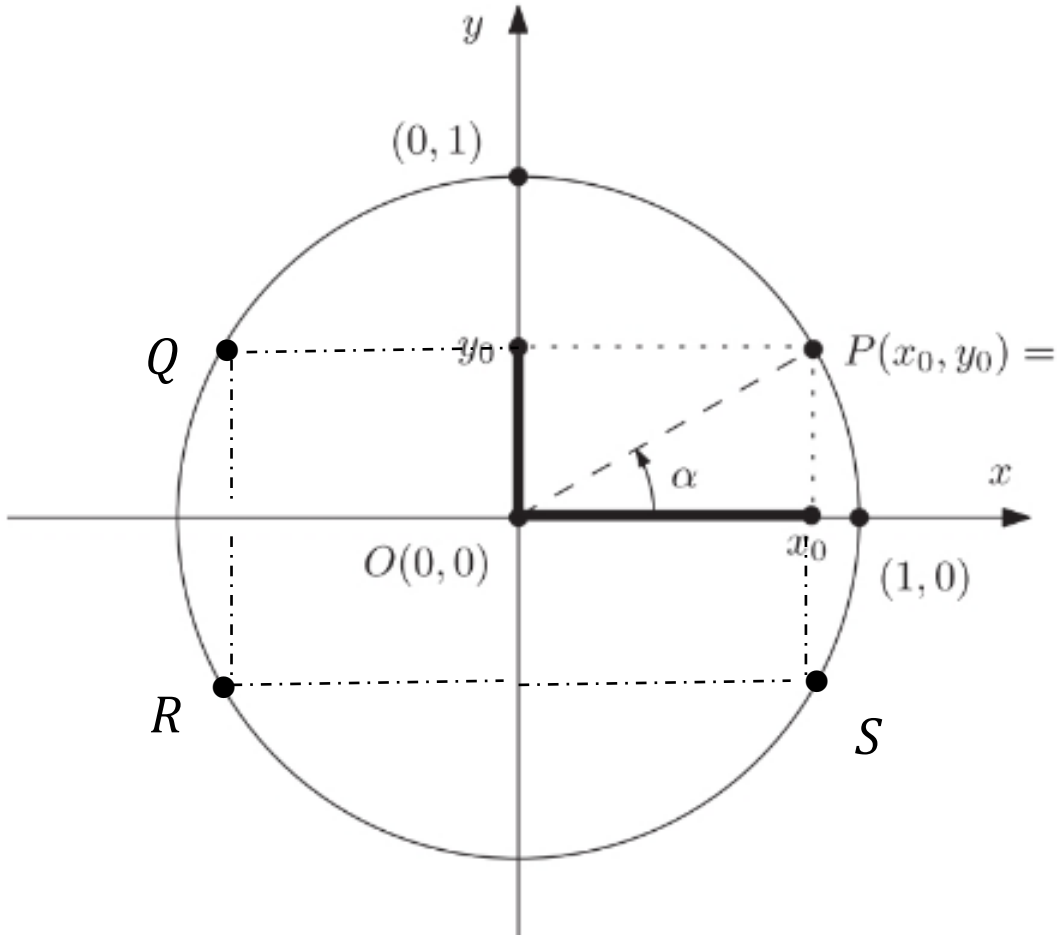
Quais são as coordenadas retangulares de P?



Seno e cosseno de um arco



Quais são as coordenadas retangulares dos pontos P, Q, R e S?

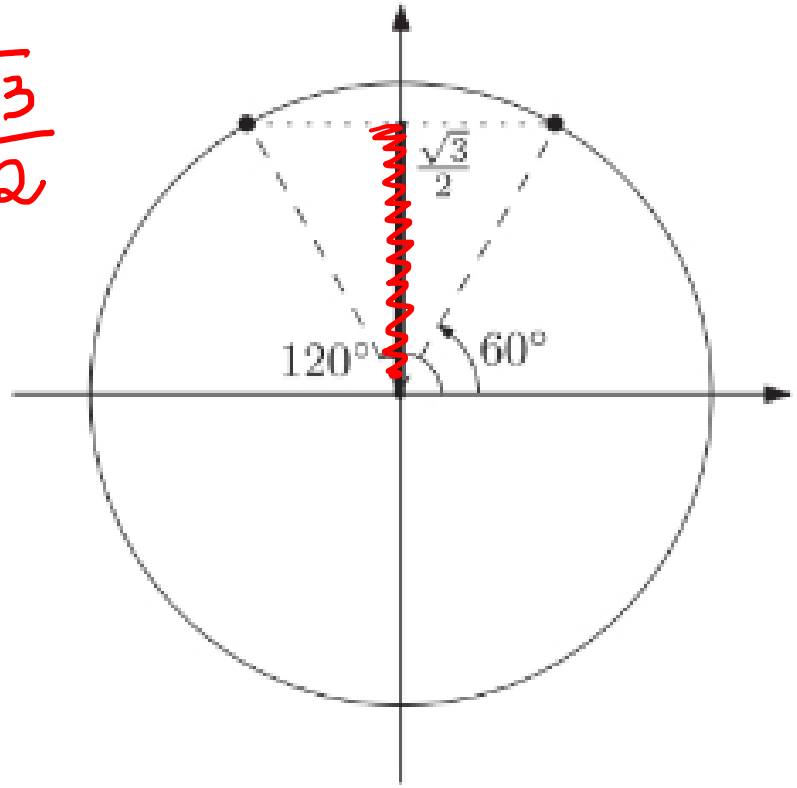


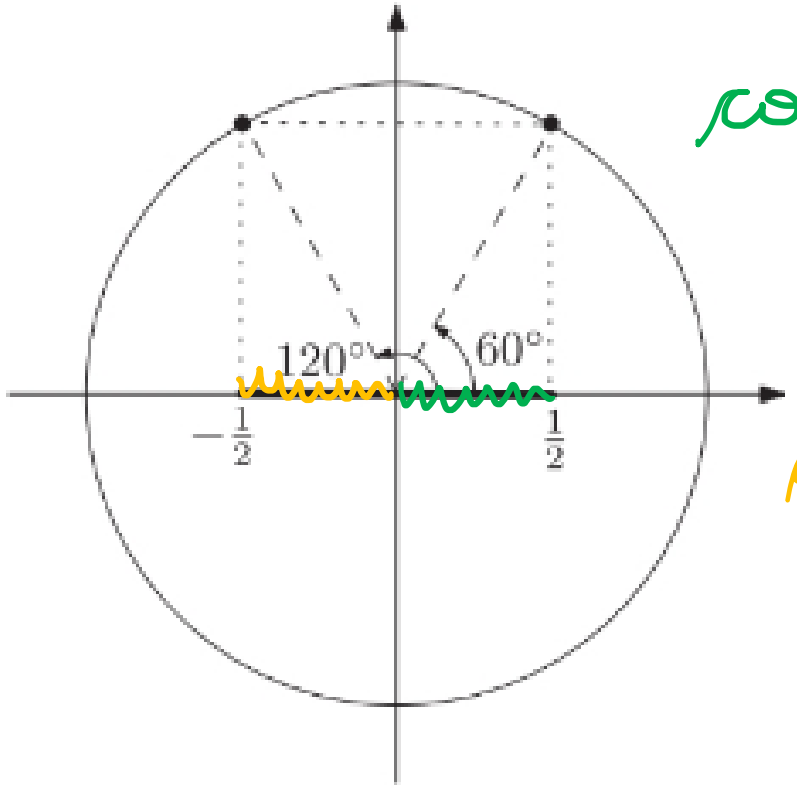
Exemplos

$\operatorname{sen} 60° = \frac{\sqrt{3}}{2}$

e

$\operatorname{sen} 120° = \frac{\sqrt{3}}{2}$





$\cos 60° = \frac{1}{2}$

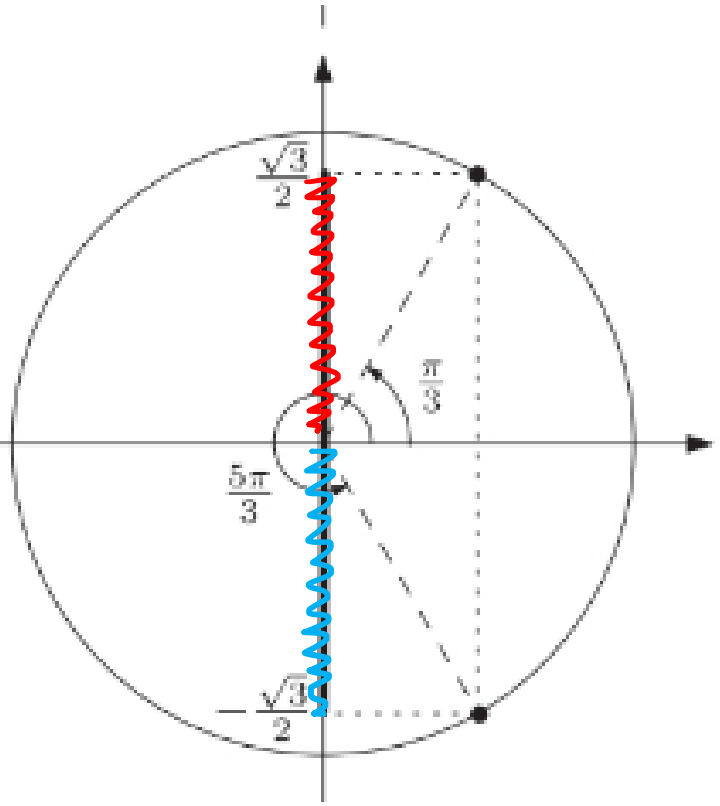
e

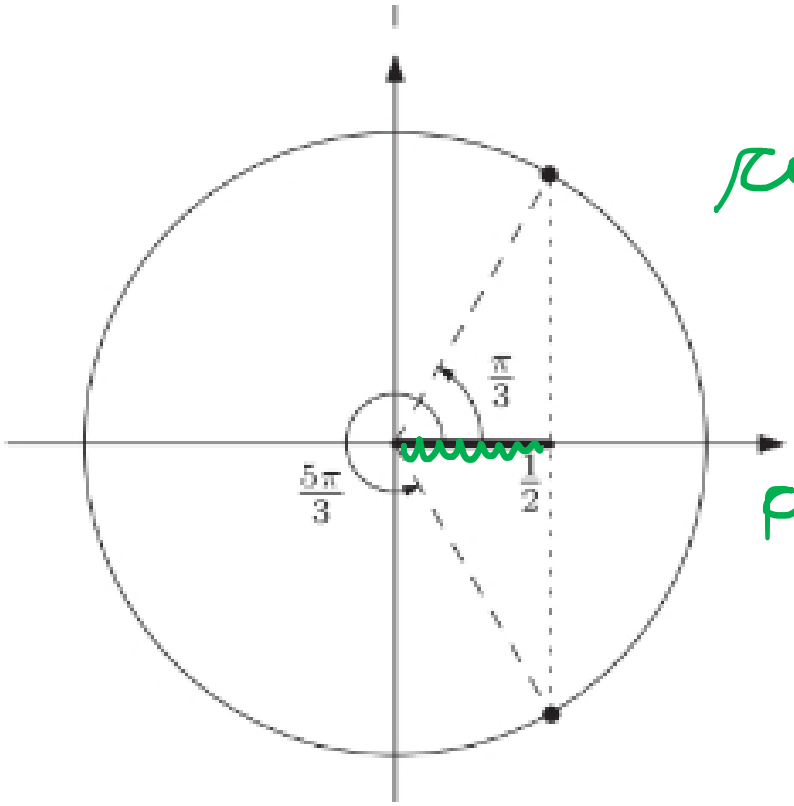
$\cos 120° = -\frac{1}{2}$

Exemplos

$\operatorname{sen}\frac{\pi}{3} = \frac{\sqrt{3}}{2}$

$\operatorname{sen}\frac{5\pi}{3} = -\frac{\sqrt{3}}{2}$

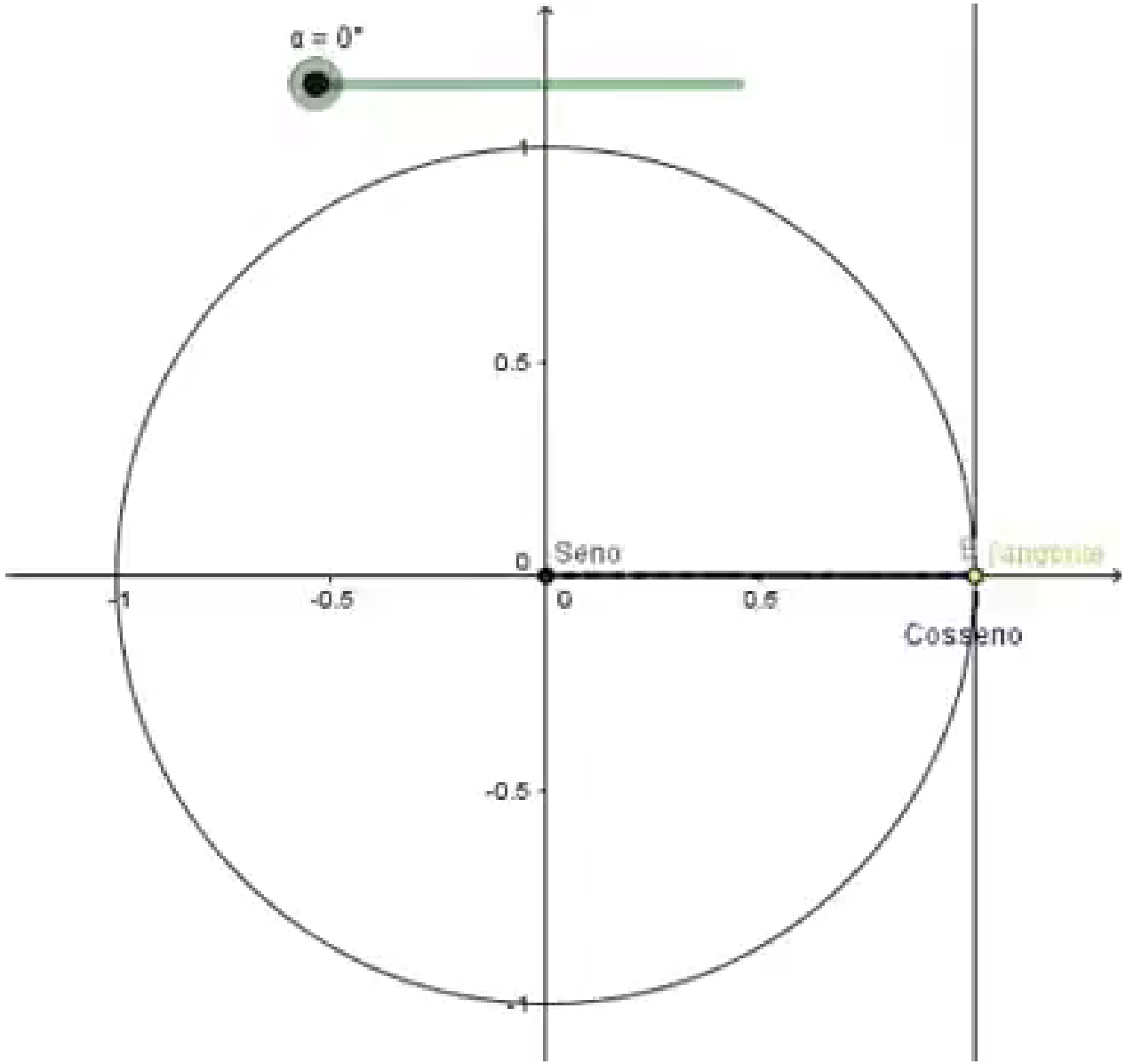




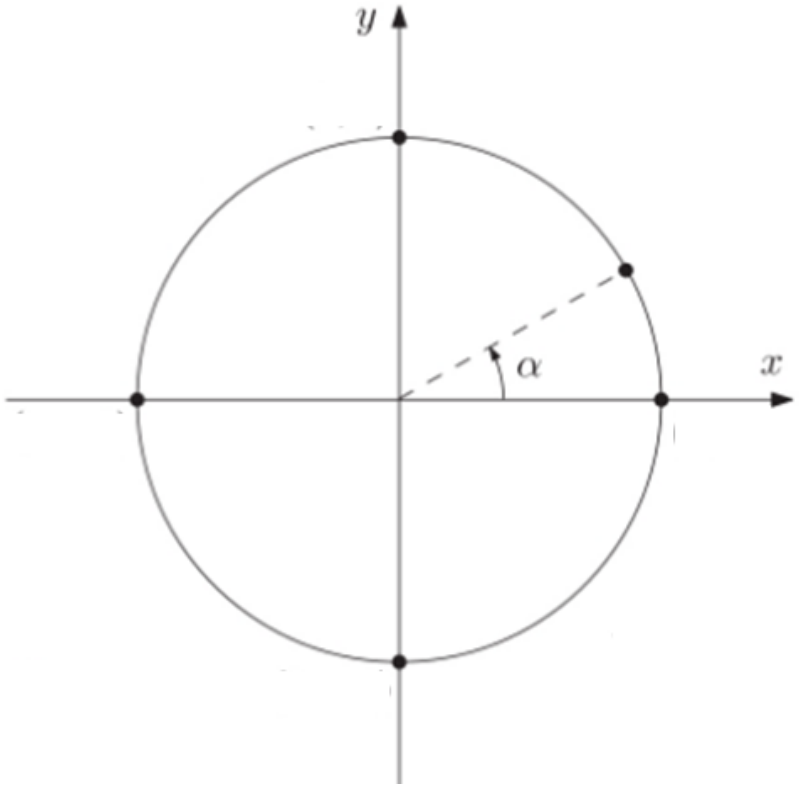
$\cos\frac{\pi}{3} = 1/2$

e

$\cos\frac{5\pi}{3} = 1/2$


α = 0°
1
0.5
0
-0.5
-1
-1
-0.5
0
0.5
Seno
Tangente
Cosseno

Algumas Identidades Trigonométricas



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

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

$$1 + \cot^2\alpha = \operatorname{cossec}^2\alpha$$

Uso da calculadora
DEG ou RAD?

$\cos 2 =$

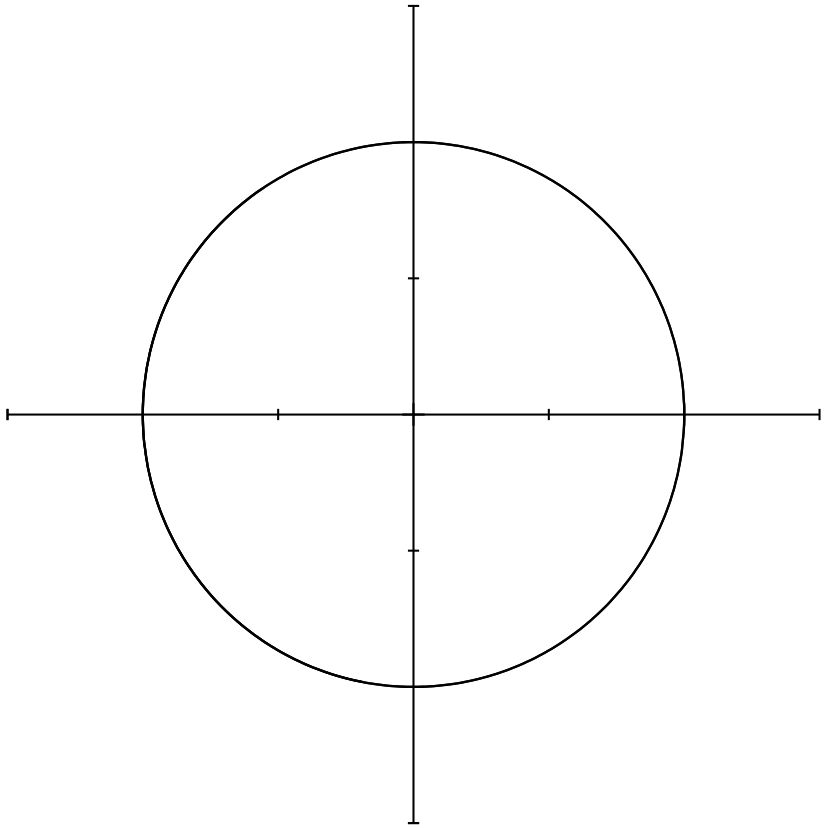
$\sin 45° =$

$\tan \pi =$

$\cot\left(\frac{\pi}{6}\right) =$

$\sec 30° =$

$\operatorname{cossec} 1 =$



Atividades da Aula 15 – Parte II

Notas de Aula, p. 36

Atividade 10:

Resolver os exercícios 8.1 ao 8.5, no livro Pré-Cálculo (p. 160)