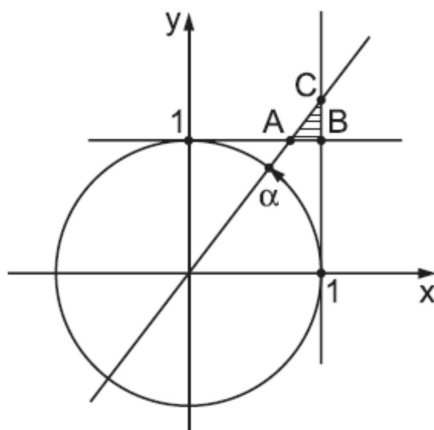


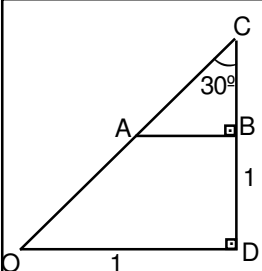
Nome: _____ Unidade: _____
 Curso: _____ Sala: _____ Matrícula: _____ Nota: _____

QUESTÃO 1 (valor 100 pontos)

Com base na figura, que representa o círculo trigonométrico e os eixos da tangente e da cotangente



a) calcule a área do triângulo ABC, para $\alpha = \frac{\pi}{3}$.



No $\triangle OCD$, temos

$$\sin 30^\circ = \frac{OD}{OC}$$

$$\frac{1}{2} = \frac{1}{OC}$$

$OC = 2$

$$(OC)^2 = (OD)^2 + (CD)^2$$

$CD = \sqrt{3}$

Logo $BC = \sqrt{3} - 1$

No $\triangle ABC$, temos

$$\tan 30^\circ = \frac{AB}{BC}$$

$$\frac{\sqrt{3}}{3} = \frac{AB}{\sqrt{3} - 1}$$

$$AB = \frac{3 - \sqrt{3}}{3}$$

Portanto

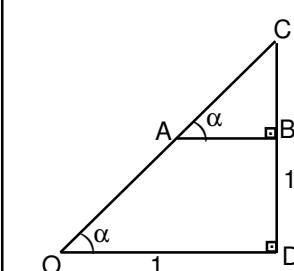
$$S_{\triangle ABC} = \frac{1}{2} AB \cdot BC$$

$$S_{\triangle ABC} = \frac{1}{2} \cdot \frac{3 - \sqrt{3}}{3} \cdot (\sqrt{3} - 1)$$

$$S_{\triangle ABC} = \frac{1}{2} \cdot \frac{4\sqrt{3} - 6}{3}$$

$S_{\triangle ABC} = \frac{2\sqrt{3} - 3}{3}$

b) determine a área do triângulo ABC, em função de α , $\frac{\pi}{4} < \alpha < \frac{\pi}{2}$.



No $\triangle OCD$, temos

$$\tan \alpha = \frac{CD}{1}$$

$$CD = \tan \alpha$$

$\triangle ACB \sim \triangle OCD$

$$\frac{AB}{1} = \frac{\tan \alpha - 1}{\tan \alpha}$$

$AB = \frac{\tan \alpha - 1}{\tan \alpha}$

Logo $BC = \tan \alpha - 1$

$S_{\triangle ABC} = \frac{(\tan \alpha - 1)^2}{2 \tan \alpha}$

