

Resoluções

Capítulo 7

Relações trigonométricas – Tangente de um arco trigonométrico

ATIVIDADES PARA SALA

01 a) $\operatorname{tg} \frac{7\pi}{6} = \operatorname{tg} \frac{\pi}{6} = \frac{\sqrt{3}}{3}$

b) $\operatorname{tg} \frac{5\pi}{3} = -\operatorname{tg} \frac{\pi}{3} = -\sqrt{3}$

c) $\operatorname{tg} \frac{9\pi}{4} = \operatorname{tg} \frac{\pi}{4} = 1$

d) $\operatorname{tg} 240^\circ = \operatorname{tg} 60^\circ = \sqrt{3}$

e) $\operatorname{tg}(-315^\circ) = \operatorname{tg} 45^\circ = 1$

f) $\operatorname{tg} 120^\circ = -\operatorname{tg} 60^\circ = -\sqrt{3}$

g) $\operatorname{tg} 150^\circ = -\operatorname{tg} 30^\circ = -\frac{\sqrt{3}}{3}$

h) $\operatorname{tg}(-300^\circ) = \operatorname{tg} 60^\circ = \sqrt{3}$

02 $R = 2 \cdot \frac{\sqrt{3}}{2} \cdot \sqrt{3} - 2 \cdot 1 = 0 \therefore R \cdot S = 0$

03 $\frac{\cos 120^\circ + \operatorname{sen} 60^\circ}{4 \cos 30^\circ + \operatorname{tg} 60^\circ} = \frac{-\frac{1}{2} + \frac{\sqrt{3}}{2}}{4 \frac{\sqrt{3}}{2} + \sqrt{3}} = \frac{\sqrt{3}-1}{2} \cdot \frac{2}{6\sqrt{3}} =$
 $\frac{\sqrt{3}-1}{6\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{3-\sqrt{3}}{18}$

04 C, A, D, B

a) $\cos 5240^\circ = \cos 200^\circ = -\cos 20^\circ$

$$\frac{5240^\circ}{200^\circ} \left| \frac{360^\circ}{14} \right.$$

b) $\operatorname{sen} 1200^\circ = \operatorname{sen} 120^\circ = \operatorname{sen} 60^\circ = \frac{\sqrt{3}}{2} = \cos 30^\circ$

$$\frac{1200^\circ}{120^\circ} \left| \frac{360^\circ}{3} \right.$$

c) $\operatorname{sen}(-210^\circ) = \operatorname{sen} 150^\circ = \operatorname{sen} 30^\circ = \frac{1}{2}$
 $-210^\circ + 360^\circ = 150^\circ$

d) $\operatorname{tg} 150^\circ + 2 \cdot \operatorname{sen} 120^\circ - \cos 330^\circ$

$$-\operatorname{tg} 30^\circ + 2 \cdot \frac{\sqrt{3}}{2} - \cos 30^\circ$$

$$-\frac{\sqrt{3}}{3} + \sqrt{3} - \frac{\sqrt{3}}{2} = \frac{-2\sqrt{3} + 6\sqrt{3} - 3\sqrt{3}}{6} = \frac{\sqrt{3}}{6}$$

05 $\frac{\operatorname{sen} 120^\circ - \cos 180^\circ}{\operatorname{tg} 30^\circ} = \frac{\frac{\sqrt{3}}{2} + 1}{\frac{\sqrt{3}}{3}} =$
 $= \frac{\sqrt{3} + 2}{2} \cdot \frac{3}{\sqrt{3}} = \frac{3 + 2\sqrt{3}}{2}$

ATIVIDADES PROPOSTAS

01 a) $\operatorname{tg} 900^\circ = \operatorname{tg} 180^\circ = 0$

$$\frac{900^\circ}{720^\circ} \left| \frac{360^\circ}{2} \right.$$

b) $\operatorname{tg}(-540^\circ) = \operatorname{tg}(-180^\circ) = \operatorname{tg} 180^\circ = 0$

$$\frac{540^\circ}{360^\circ} \left| \frac{360^\circ}{1} \right.$$

c) $\operatorname{tg} 1500^\circ = \operatorname{tg} 60^\circ = \sqrt{3}$

$$\frac{1500^\circ}{1440^\circ} \left| \frac{360^\circ}{4} \right.$$

d) $\operatorname{tg} \frac{13\pi}{3} = \operatorname{tg} 780^\circ = \operatorname{tg} 60^\circ = \sqrt{3}$

$$\frac{780^\circ}{720^\circ} \left| \frac{360^\circ}{2} \right.$$

02 a) $\operatorname{tg} 70^\circ > \operatorname{tg} 760^\circ$ d) $\operatorname{tg}(-160^\circ) > \operatorname{tg} 128^\circ$

b) $\operatorname{tg} 21^\circ > \operatorname{tg}(-21^\circ)$ e) $\operatorname{tg} 0^\circ = \operatorname{tg} 400\pi$

c) $\operatorname{tg} 129^\circ < \operatorname{tg} 217^\circ$ f) $\operatorname{tg} \frac{20\pi}{3} < \operatorname{tg}(-16^\circ)$

03 a) $f(g(x)) = 1 + \operatorname{tg} \frac{x}{2}$

b) $g\left(\frac{\pi}{2}\right) = \frac{\pi}{4} \Rightarrow f\left(\frac{\pi}{4}\right) = 1 + \operatorname{tg} \frac{\pi}{4} = 2$

04 $\operatorname{tg}^2 x = \sqrt{3} \operatorname{tg} x \Rightarrow \operatorname{tg} x = 0 \Rightarrow x = 0$ ou $x = \pi$
 ou $\operatorname{tg} x = \sqrt{3} \Rightarrow x = \frac{\pi}{3}$ ou $x = \frac{4\pi}{3}$

Soma = $0 + \pi + \frac{\pi}{3} + \frac{4\pi}{3} = \pi + \frac{5\pi}{3} = \frac{8\pi}{3}$ rad

05 B

$$\begin{aligned} & \cos\left(\frac{2\pi}{3}\right) + \operatorname{sen}\left(\frac{3\pi}{2}\right) + \operatorname{tg}\left(\frac{5\pi}{4}\right) = \\ & = \cos 120^\circ + \operatorname{sen} 270^\circ + \operatorname{tg} 225^\circ = \\ & = -(\cos 60^\circ) - 1 + (\operatorname{tg} 45^\circ) = \\ & = -\frac{1}{2} - 1 + 1 = -\frac{1}{2} \end{aligned}$$

06 a) $\frac{\pi}{3}$ 1ª quadrante (+)

b) $\frac{5\pi}{3}$ 4ª quadrante (-)

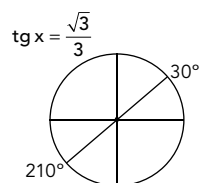
c) $\frac{5\pi}{6}$ 2ª quadrante (-)

d) $\frac{11\pi}{6}$ 4ª quadrante (-)

e) $\frac{4\pi}{3}$ 3ª quadrante (+)

07 Pela condição dada, tem-se o seguinte:

$x \in [0, 2\pi]$



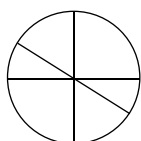
$S = \{30^\circ, 210^\circ\}$

08 $A = -\frac{\sqrt{3}}{3} + \sqrt{3} = \frac{2\sqrt{3}}{3}$

$B = -\sqrt{3} + \sqrt{3} = 0 \therefore A \cdot B = 0$

09 Pela condição dada, tem-se o seguinte:

$\operatorname{tg} x = -1, x \in [-2\pi, 2\pi]$



$\frac{3\pi}{4} = 135^\circ$

$315^\circ = \frac{7\pi}{4}$

$-\frac{5\pi}{4} = -225^\circ$

$-45^\circ = -\frac{\pi}{4}$

10 $\frac{3}{5} \cdot \operatorname{tg} \frac{5\pi}{3} + \frac{6}{7} \cdot \operatorname{tg} \frac{7\pi}{6} + \frac{2}{3} \cdot \cos \frac{3\pi}{2} =$
 $= \frac{3}{5} \cdot \operatorname{tg} 300^\circ + \frac{6}{7} \cdot \operatorname{tg} 210^\circ + \frac{2}{3} \cdot \cos 270^\circ =$
 $= \frac{3}{5} \cdot (-\operatorname{tg} 60^\circ) + \frac{6}{7} \cdot (\operatorname{tg} 30^\circ) + \frac{2}{3} \cdot 0 =$
 $= \frac{3}{5} \cdot (-\sqrt{3}) + \frac{6}{7} \cdot \left(\frac{\sqrt{3}}{3}\right) + 0 =$
 $= \frac{-3\sqrt{3}}{5} + \frac{2\sqrt{3}}{7} = \frac{-21\sqrt{3} + 10\sqrt{3}}{35} =$
 $= -\frac{11\sqrt{3}}{35}$