



MTM3100 - Pré-cálculo

Gabarito parcial da 14ª lista complementar de exercícios

1. (a)  $\operatorname{tg}(\operatorname{arcsen} x) = \frac{x}{\sqrt{1-x^2}}$ ; (b)  $\operatorname{cotg}(\operatorname{arcsen} x) = \frac{\sqrt{1-x^2}}{x}$ ;  
(c)  $\operatorname{sec}(\operatorname{arcsen} x) = \frac{1}{\sqrt{1-x^2}}$ ; (d)  $\operatorname{cossec}(\operatorname{arcsen} x) = \frac{1}{x}$ .
2. (a)  $\operatorname{sen}(\operatorname{arctg} x) = \frac{x}{\sqrt{1+x^2}}$ ; (b)  $\operatorname{cos}(\operatorname{arctg} x) = \frac{1}{\sqrt{1+x^2}}$ .
3. (a)  $\operatorname{tg}(\operatorname{arcsen}(-1/3)) = -\frac{\sqrt{2}}{4}$ ; (b)  $\operatorname{cos}(\operatorname{arctg} 2) = \frac{\sqrt{5}}{5}$ .
4. (a)  $\operatorname{tg} x \operatorname{cossec} x = \sec x$ . (b)  
(c)  $\cos^2 x (1 + \operatorname{tg}^2 x) = 1$ . (d)  
(e)  $\frac{1 + \cos x}{1 + \sec x} = \cos x$ . (f)  
(g)  $\frac{\sec^2 x - 1}{\sec^2 x} = \operatorname{sen}^2 x$ . (h)  
(i)  $\operatorname{tg} x \cos x \operatorname{cossec} x = 1$ .
- 5.
6. (a)  $\frac{x}{\sqrt{1-x^2}} = \operatorname{tg} t$ .  
(b)  $\sqrt{1+x^2} = \sec t$ .  
(c)  
(d)  $\frac{x}{\sqrt{4+x^2}} = \operatorname{sen} t$ .  
(e)  $\sqrt{9-x^2} = 3 \cos t$ .
- 7.
- 8.
- 9.

(a)  $\operatorname{sen} 15^\circ = \frac{\sqrt{2}(\sqrt{3}-1)}{4}$ ;

(b)  $\cos 195^\circ = -\frac{\sqrt{2}(\sqrt{3}+1)}{4}$ ;

(c)  $\operatorname{tg} 165^\circ = \frac{1-\sqrt{3}}{1+\sqrt{3}}$ ;

(d)  $\operatorname{sen}(-5\pi/12) = -\frac{\sqrt{2}(\sqrt{3}+1)}{4}$ ;

(e)  $\cos(11\pi/12) = -\frac{\sqrt{2}(\sqrt{3}+1)}{4}$ ;

(f)  $\operatorname{tg}(7\pi/12) = -\frac{\sqrt{3}+1}{\sqrt{3}-1}$ .

10.

(a)  $\cos(\operatorname{arcsen} x - \operatorname{arctg} y) = \frac{xy + \sqrt{1-x^2}}{\sqrt{1+y^2}}$ ;

(b)  $\operatorname{tg}(\operatorname{arcsen} x + \arccos y) = \frac{xy + \sqrt{1-x^2}\sqrt{1-y^2}}{y\sqrt{1-x^2} - x\sqrt{1-y^2}}$ .

11.

12.

13.

14.

(a)  $\operatorname{sen}^4 x = \frac{3}{8} - \frac{\cos(2x)}{2} + \frac{\cos(4x)}{8}$ .

(b)  $\cos^4 x = \frac{3}{8} + \frac{\cos(2x)}{2} + \frac{\cos(4x)}{8}$ .

(c)  $\cos^2 x \operatorname{sen}^2 x = \frac{1}{8} - \frac{\cos(4x)}{8}$ .

15.

16. (a)  $S = \{x \in \mathbb{R} \mid \pi/6 + 2k\pi < x < 5\pi/6 + 2k\pi, \text{ para algum } k \in \mathbb{Z}\}$ .

(b)  $S = \{x \in \mathbb{R} \mid \pi/2 + 2k\pi \leq x \leq 3\pi/2 + 2k\pi, \text{ para algum } k \in \mathbb{Z}\}$ .

17.  $f(t) = 0,5e^{-1,4t} \cos(400\pi t)$ , em que  $t$  é medido em segundos e  $f(t)$  em centímetros.

18.

(a)  $c = \frac{\ln 5}{2}s^{-1}$ .

(b)  $f(t) = 3(\sqrt{5})^t \cos(330\pi t)$ , em que  $t$  é medido em segundos e  $f(t)$  em centímetros.