01. Temos:

$Q(x) = 40 + 4\text{ sen}\left(\dfrac{\pi x}{6}\right)$

Condição:

$38 = 40 + 4\text{ sen}\left(\dfrac{\pi x}{6}\right)$

$\text{sen}\left(\dfrac{\pi x}{6}\right) = -\dfrac{1}{2} \to \text{sen}\left(-\dfrac{\pi x}{6}\right) = \dfrac{1}{2}$

Então:

$-\dfrac{\pi x}{6} = \dfrac{\pi}{6} + k \cdot 2\pi,\ k \in z \to \boxed{x = -1 - 12k}$ ou $-\dfrac{\pi x}{6} = \dfrac{5\pi}{6} + k \cdot 2\pi,\ k \in z \to \boxed{x = -5 - 12k}$

Assim, para k = – 1, temos:

x = 11 (novembro) ou x = 7 → (julho)

Resposta: D

02. Temos:

$\alpha + \beta + \theta = 180° \to \cos(\alpha + \beta) = -\cos\theta$

Então:

$-\dfrac{1}{2} = -\cos\theta \to \cos\theta = \dfrac{1}{2}$

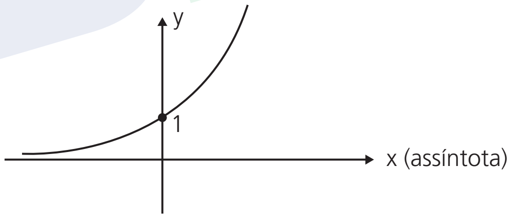
Como $\theta \in [0, \pi]$, encontramos:

$\theta = \dfrac{\pi}{3}$ rad.

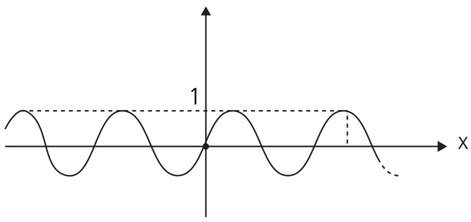
Resposta: C

03.

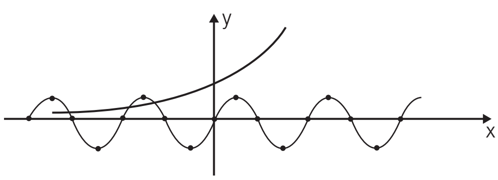
i) Gráfico de f(x)



ii) Gráfico de g(x)



iii) Representando **f** e **g** num único plano, veremos o gráfico de **f** interceptando o gráfico de **g** em infinitos pontos com x < 0.



Resposta: C

04. Temos que:

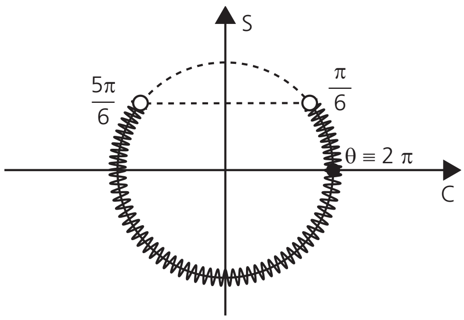
$\sqrt{1-\cos^2 x} + \text{sen}\,x < 1$

$\sqrt{\text{sen}^2 x} + \text{sen}\,x < 1$

$|\text{sen}\,x| + \text{sen}\,x < 1$

1º Caso: se sen x ≥ 0, vem:

$\text{sen}\,x + \text{sen}\,x < 1 \rightarrow \text{sen}\,x < \frac{1}{2}$



$S_1 = \left[0, \frac{\pi}{6}\right) \cup \left(\frac{5\pi}{6}, 2\pi\right)$

2º Caso: se sen x < 0, vem:

$-\text{sen}\,x + \text{sen}\,x < 1$

$0 \cdot \text{sen}\,x < 1 \rightarrow s_2 = (\pi, 2\pi)$

Logo:

$S_{final} = S_1 \cup S_2 = S_1$

Resposta: C

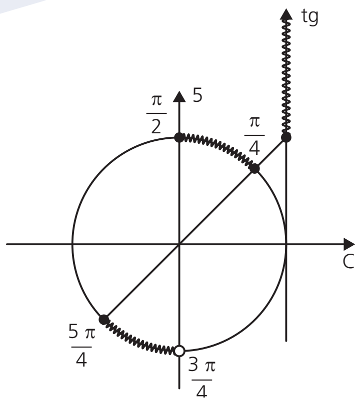
05. Temos:

$y = \sqrt{-1 + \text{tg}\,2x},\ x \in [0, \pi)$

Aplicando a condição de existência da raiz quadrada nos reais, encontramos:

$-1 + \text{tg}\,2x \geq 0$

$\text{tg}\,2x \geq 1$



Logo:

$\frac{\pi}{4} \leq 2x < \frac{\pi}{2} \rightarrow \frac{\pi}{8} \leq x < \frac{\pi}{4}$ (OK)

ou

$\frac{5\pi}{4} \leq 2x < \frac{3\pi}{2} \rightarrow \frac{5\pi}{8} \leq x < \frac{3\pi}{4}$ (OK)

Resposta: B