

SOLUCIÓN A LOS EJERCICIOS DE TRIGONOMETRÍA

1. a)

$$\operatorname{sen}\left(\frac{\pi}{2} + \alpha\right) = \operatorname{sen}\frac{\pi}{2} \cdot \cos \alpha + \operatorname{sen} \alpha \cdot \cos \frac{\pi}{2} = \cos \alpha = \sqrt{1 - 0,4^2} = \sqrt{0,84}$$

$$\cos\left(3\frac{\pi}{2} - \alpha\right) = \cos 3\frac{\pi}{2} \cdot \cos \alpha - \operatorname{sen} 3\frac{\pi}{2} \cdot \operatorname{sen} \alpha = (-1) \cdot (-0,4) = 0,4$$

$$\tan(\pi - \alpha) = \frac{\tan \pi - \tan \alpha}{1 + \tan \pi \cdot \tan \alpha} = \frac{0 - \tan \alpha}{1 + 0 \cdot \tan \alpha} = \frac{-0,4}{\sqrt{0,84}}$$

$$\operatorname{sen}(2\pi - \alpha) = \operatorname{sen} 2\pi \cdot \cos \alpha - \cos 2\pi \cdot \operatorname{sen} \alpha = \operatorname{sen} \alpha = \sqrt{1 - 0,6^2} = \sqrt{0,64} = 0,8$$

b) $\cos\left(\frac{\pi}{2} + \alpha\right) = \cos \frac{\pi}{2} \cdot \cos \alpha - \operatorname{sen} \frac{\pi}{2} \cdot \operatorname{sen} \alpha = -\operatorname{sen} \alpha = -0,8$

$$\tan\left(3\frac{\pi}{2} - \alpha\right) = \frac{\tan 3\frac{\pi}{2} - \tan \alpha}{1 + \tan 3\frac{\pi}{2} \cdot \tan \alpha} = \text{no existe}$$

c) si la $\tan(\alpha)=2$, entonces el $\cos(\alpha)=1/1+2^2$

$$\operatorname{sen}\left(3\frac{\pi}{2} + \alpha\right) = \operatorname{sen} 3\frac{\pi}{2} \cdot \cos \alpha + \cos 3\frac{\pi}{2} \cdot \operatorname{sen} \alpha = -\cos \alpha = \frac{-1}{5}$$

$$\cos(\pi - \alpha) = \cos \pi \cdot \cos \alpha + \operatorname{sen} \pi \cdot \operatorname{sen} \alpha = -\cos \alpha = \frac{-1}{5}$$

$$\tan\left(\frac{\pi}{2} + \alpha\right) = \frac{\tan \frac{\pi}{2} + \tan \alpha}{1 - \tan \frac{\pi}{2} \cdot \tan \alpha} = \text{no existe}$$

2. a) $\cos(\alpha)=0,3$

$$\operatorname{sen} 2\alpha = 2\operatorname{sen} \alpha \cdot \cos \alpha = 2 \cdot 0,3 \cdot \sqrt{1 - 0,3^2} = 0,6 \cdot \sqrt{0,91} = 0,56$$

$$\cos 2\alpha = \cos^2 \alpha - \operatorname{sen}^2 \alpha = 0,3^2 - \sqrt{0,91}^2 = 0,09 - 0,91 = -0,82$$

$$\tan 2\alpha = \frac{\operatorname{sen} 2\alpha}{\cos 2\alpha} = \frac{0,56}{-0,82} = -0,68$$

b) $\cos(2\alpha)=0,4$

$$\cos 2\alpha = \cos^2 \alpha - \operatorname{sen}^2 \alpha = \cos^2 \alpha - (1 - \cos^2 \alpha) = 2\cos^2 \alpha - 1 = 0,4 \rightarrow \cos^2 \alpha = \frac{0,4+1}{2} = 0,7 \rightarrow \cos \alpha = \sqrt{0,7}$$

$$\cos 2\alpha = 1 - \operatorname{sen}^2 \alpha - \operatorname{sen}^2 \alpha = 0,4 \rightarrow \operatorname{sen}^2 \alpha = \frac{1-0,4}{2} = 0,3 \rightarrow \operatorname{sen} \alpha = \sqrt{0,3}$$

$$\tan \alpha = \frac{\sqrt{0,3}}{\sqrt{0,7}}$$

$$\operatorname{sen} 2\alpha = 2\operatorname{sen} \alpha \cdot \cos \alpha = 2 \cdot \frac{1}{\sqrt{10}} \cdot \sqrt{1 - \frac{1}{10}} = \frac{2\sqrt{0,9}}{\sqrt{10}}$$

c) $\tan(\alpha)=3$ $\cos 2\alpha = 2\cos^2 \alpha - 1 = 2 \cdot \left(\frac{1}{\sqrt{10}}\right)^2 - 1 = \frac{2 - \sqrt{10}}{\sqrt{10}}$

$$\tan 2\alpha = \frac{2\sqrt{0,9}}{2 - \sqrt{10}}$$

