Da teoria:

$$\cos^2 x + \operatorname{sen}^2 x = 1$$

1. Dado $\operatorname{sen} x = \frac{2}{3}$, quais são os possíveis valores de $\cos x$?

$\operatorname{sen} x = \frac{2}{3}$

$$\operatorname{sen}^2 x + \cos^2 x = 1$$

$$\left(\frac{2}{3}\right)^2 + \cos^2 x = 1$$

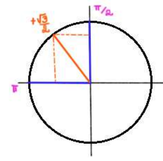
$$\cos^2 x = 1 - \frac{4}{9}$$

$$\cos^2 x = \frac{5}{9} \quad \cos x = \pm\sqrt{\frac{5}{9}}$$

$$\boxed{\cos x = \pm\frac{\sqrt{5}}{3}}$$

2. Dado $\cos x = -\frac{1}{2}$ e $\frac{\pi}{2} < x < \pi$, calcule o valor da expressão $2\operatorname{sen} x + \sqrt{3}$.

$\cos x = -\frac{1}{2}$ e $\frac{\pi}{2} < x < \pi$



$$\operatorname{sen}^2 x + \cos^2 x = 1$$

$$\operatorname{sen}^2 x + \left(-\frac{1}{2}\right)^2 = 1$$

$$\operatorname{sen}^2 x = 1 - \frac{1}{4}$$

$$\operatorname{sen}^2 x = \frac{3}{4}$$

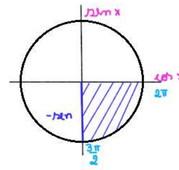
$$\operatorname{sen} x = \pm\sqrt{\frac{3}{4}} \quad \boxed{\operatorname{sen} x = \pm\frac{\sqrt{3}}{2}}$$

$2.\operatorname{sen} x + \sqrt{3}$

$2.\frac{\sqrt{3}}{2} + \sqrt{3}$

$2\sqrt{3}$

3. Dado $\cos\alpha = \frac{5}{13}$ e $\frac{3\pi}{2} < \alpha < 2\pi$, calcule a expressão $100 + 26\operatorname{sen}\alpha$.



$$\operatorname{sen}^2\alpha + \cos^2\alpha = 1$$

$$\operatorname{sen}^2\alpha + \left(\frac{5}{13}\right)^2 = 1$$

$$\operatorname{sen}^2\alpha = \frac{144}{169}$$

$$\operatorname{sen}\alpha = \pm\sqrt{\frac{144}{169}} \quad \boxed{\operatorname{sen}\alpha = \pm\frac{12}{13}}$$

$\operatorname{sen}\alpha = -\frac{12}{13}$

$100 + 26.\operatorname{sen}\alpha$

$$100 + 26.\left(-\frac{12}{13}\right)$$

$100 - 24 = 76$

4. Calcule o valor de $y = 5(\cos x)^2 + \cos x + 5$, sendo dado $\operatorname{sen} x = 0{,}6$ e x pertence ao 1° quadrante.

$\operatorname{sen} x = 0{,}6$

$$\operatorname{sen}^2 x + \cos^2 x = 1$$

$$(0{,}6)^2 + \cos^2 x = 1$$

$$\cos^2 x = 1 - 0{,}3 \quad (0{,}64)$$

$\cos x = \pm 0{,}8$

x está no 1º quadrante, portanto $\cos x$ é positivo.

$\cos x = +0{,}8$

$y = 5.\cos^2 x + \cos x + 5$

$y = 5.(0{,}8)^2 + 0{,}8 + 5$

$y = 5.0{,}64 + 5{,}8$

$\boxed{y = 9}$

5. Calcule k de modo que se tenha simultaneamente $\operatorname{sen}\alpha = 1 + 4k$ e $\cos\alpha = 1 + 2k$.

$\operatorname{sen}\alpha = 1 + 4k$ e $\cos\alpha = 1 + 2k$

$$\operatorname{sen}^2 x + \cos^2 x = 1$$

$$(1+4k)^2 + (1+2k)^2 = 1$$

$$(1+4k).(1+4k) + (1+2k).(1+2k) = 1$$

$$1^2 + 4k + 4k + 16k^2 + 1^2 + 2k + 2k + 4k^2 = 1$$

$$20k^2 + 12k + 1 = 0$$

$\Delta = 12^2 - 4.1.20$

$\Delta = 64$

$-\frac{12 \pm \sqrt{64}}{2.20}$

$k_1 = -1/2$, $k_2 = -1/10$

$\boxed{K = -1/2 \text{ ou } K = -1/10}$