$\operatorname{sen}(x) = a$

$x = K\pi + (-1)^K \arcsin(\alpha)$

$\cos(x) = \bar{a}$

$x = 2K\pi \pm \arccos(\bar{a})$

$\operatorname{sen}(x) = 1$

$x = K\pi + (-1)^K \underbrace{\operatorname{arcsen}(1)}_{rad}$

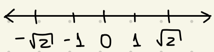
$\rightarrow \sqrt{2}\cos(x) = a \,,\; a \in \mathbb{Z}$

$-1 \leq \cos(x) \leq 1$

$\cos(x) = \dfrac{a}{\sqrt{2}}$

$\Leftrightarrow -1 \leq \dfrac{a}{\sqrt{2}} \leq 1 \;/\sqrt{2}$

$-\sqrt{2} \leq a \leq \sqrt{2}$



(1) $\cos(x) = \dfrac{-1}{\sqrt{2}} \cdot \dfrac{\sqrt{2}}{\sqrt{2}} = \dfrac{-\sqrt{2}}{2}$

$x = 2K\pi \pm \arccos\left(-\frac{\sqrt{2}}{2}\right) = 2K\pi \pm \left(-\frac{3\pi}{4}\right)$

(2) $\cos(x) = 0$

$x = 2K\pi \pm \arccos(0) = 2K\pi \pm \dfrac{\pi}{2}$

(3) $\cos(x) = \dfrac{1}{\sqrt{2}} \cdot \dfrac{\sqrt{2}}{\sqrt{2}} = \dfrac{\sqrt{2}}{2}$

$x = 2K\pi \pm \arccos\left(\frac{\sqrt{2}}{2}\right) = 2K\pi \pm \dfrac{\pi}{4}$

P2 | Si $\alpha = 2 \cdot \beta \Longrightarrow a^2 = b(b+c)$

Teorema seno(θ)

$$\frac{\operatorname{sen}(\alpha)}{\operatorname{sen}(\beta)} = \frac{a}{b} \Rightarrow \frac{\operatorname{sen}(2\beta)}{\operatorname{sen}(\beta)} = \frac{a}{b} \rightarrow \frac{2\,\cancel{\operatorname{sen}(\beta)}\cos(\beta)}{\cancel{\operatorname{sen}(\beta)}} = \frac{a}{b} \Rightarrow \cos(\beta) = \frac{a}{2b}$$

Teorema coseno

$b^2 = a^2 + c^2 - 2ac\,\underbrace{\cos(\beta)}$

$b^2 = a^2 + c^2 - \cancel{2}ac \cdot \dfrac{a}{\cancel{2}b}$

$b^2 = a^2 + c^2 - \dfrac{a^2 c}{b}$

$b^2 - c^2 = a^2\left(1 - \frac{c}{b}\right) \quad \frac{b}{b} - \frac{c}{b}$

$\dfrac{b(b^2 - c^2)}{b - c} = a^2$

$\dfrac{b\cancel{(b-c)}(b+c)}{\cancel{(b-c)}} = a^2 \Rightarrow b(b+c) = a^2 \quad b \neq c$

P1

$$\tan(4x) = \frac{4\tan(x) - 4\tan^3(x)}{1 - 6\tan^2(x) + \tan^4(x)}$$

$$\tan(2x+2x) = \frac{\text{sen}(2(2x))}{\cos(2x+2x)} = \frac{2\,\text{sen}(2x)\cos(2x)}{\cos^2(2x) - \text{sen}(2x)}$$

$$= \frac{2 \cdot 2\,\text{sen}(x)\cos(x)\left[\cos^2(x) - \text{sen}^2(x)\right]}{\cos(2x)\cos(2x) - \text{sen}(2x)\,\text{sen}(2x)}$$

$$= \frac{4\,\text{sen}(x)\cos^3(x) - 4\,\text{sen}^3(x)\cos(x)}{(\cos^2 - \text{sen}^2)(\cos^2 - \text{sen}^2) - (2\,\text{sen}(x)\cos(x)(2\,\text{sen}(x)\cos(x))}$$

$$= \frac{4\,\text{sen}(x)\cos^3(x) - 4\,\text{sen}^3(x)\cos(x)}{\cos^4 - 2\,\text{sen}^2\cos^2 + \text{sen}^4 - 4\,\text{sen}^2\cos^2}$$

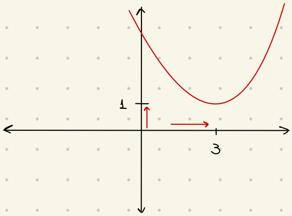
$$= \frac{4\,\text{sen}(x)\cos^3(x) - 4\cos(x)\,\text{sen}^3(x)}{\cos^4(x) - 6\cos^2\,\text{sen}^2 + \text{sen}^2(x)} \cdot 1 \rightarrow \frac{\frac{1}{c^4}}{\frac{1}{c^4}}$$

$$= \frac{\dfrac{4\,\text{sen}(x)\cos^{\cancel{3}}(x)}{\cos^{\cancel{4}}(x)} - \dfrac{4\,\cancel{\cos(x)}\,\text{sen}^3(x)}{\cos^{\cancel{4}\,3}(x)}}{\dfrac{\cancel{\cos^4(x)}}{\cancel{\cos^4(x)}} - \dfrac{6\,\cancel{\cos^2(x)}\,\text{sen}^2(x)}{\cos^{\cancel{4}\,2}(x)} + \dfrac{\text{sen}^{\cancel{4}}(x)}{\cancel{\cos}^4(x)}}$$

$$\Longrightarrow \frac{4\tan(x) - 4\tan^3(x)}{1 - 6\tan^2(x) + \tan^4(x)}$$

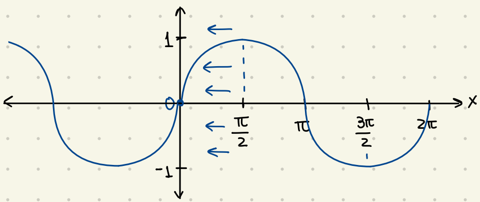
$f(x) = (x-3)^2 + 1$

$f(x) = (x+3)^2 + 1$

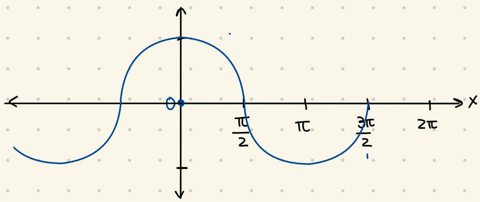


$f(x) = 2\,\text{sen}\left(x + \frac{\pi}{2}\right)$

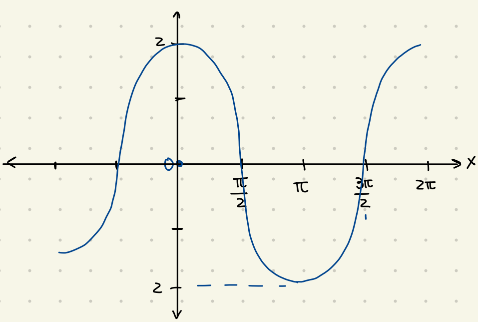
(1) $\text{Sen}(x)$:



(2) $\text{Sen}\left(x + \frac{\pi}{2}\right)$:

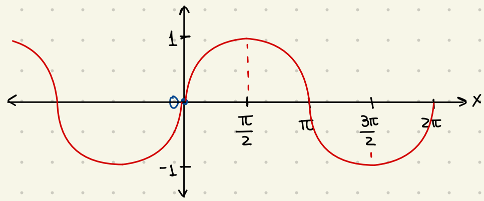


(3) $2\ \text{sen}\left(x + \frac{\pi}{2}\right)$:

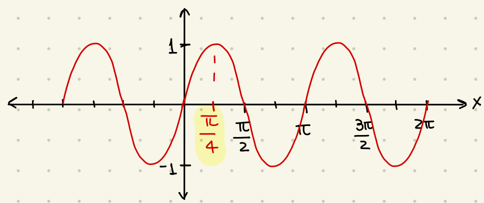


$f(x) = 3\ \text{sen}\left(2x + \frac{\pi}{2}\right)$

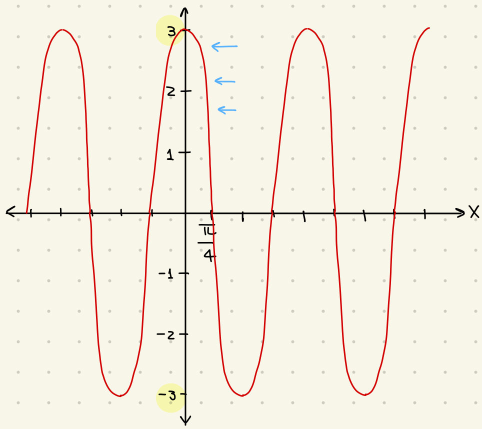
(1) $\text{Sen}(x)$:



(2) $\text{Sen}(2x)$



(3) $3\,\text{Sen}\left(2x + \frac{\pi}{2}\right)$



P1

$$\frac{1}{2}\operatorname{sen}(x)\sec^2\left(\frac{x}{2}\right)+\cos(x)+\tan\left(\frac{x}{2}\right)-\operatorname{sen}(x)=0$$

$$x = 2\alpha$$
$$f(\alpha) = 2\alpha$$

$$\Rightarrow \frac{1}{2}\operatorname{sen}(2\alpha)\sec^2(\alpha)+\cos(2\alpha)\tan(\alpha)-\operatorname{sen}(2\alpha)$$

$$= \frac{1}{2}\cdot\frac{2\operatorname{sen}(\alpha)\cos(\alpha)}{\cos^2(\alpha)}+\frac{[\cos^2(\alpha)-\operatorname{sen}^2(\alpha)]\operatorname{sen}(\alpha)}{\cos(\alpha)}-\operatorname{sen}(2\alpha)$$

$$= \tan(\alpha)+\operatorname{sen}(\alpha)\cos(\alpha)-\operatorname{sen}^2(\alpha)\tan(\alpha)-\operatorname{sen}(2\alpha)$$

$$= \tan(\alpha)\left[\frac{\operatorname{sen}^2(\alpha)+\cos^2(\alpha)}{1}-\operatorname{sen}(\alpha)\right]+\operatorname{sen}(\alpha)\cos(\alpha)-\operatorname{sen}(2\alpha)$$

$$= \tan(\alpha)\cos^2(\alpha)+\operatorname{sen}(\alpha)\cos(\alpha)+\operatorname{sen}(2\alpha)$$

$$= \cancel{\operatorname{sen}(\alpha)\cos(\alpha)+\operatorname{sen}(\alpha)\cos(\alpha)}-\cancel{\operatorname{sen}(2\alpha)} = 0$$