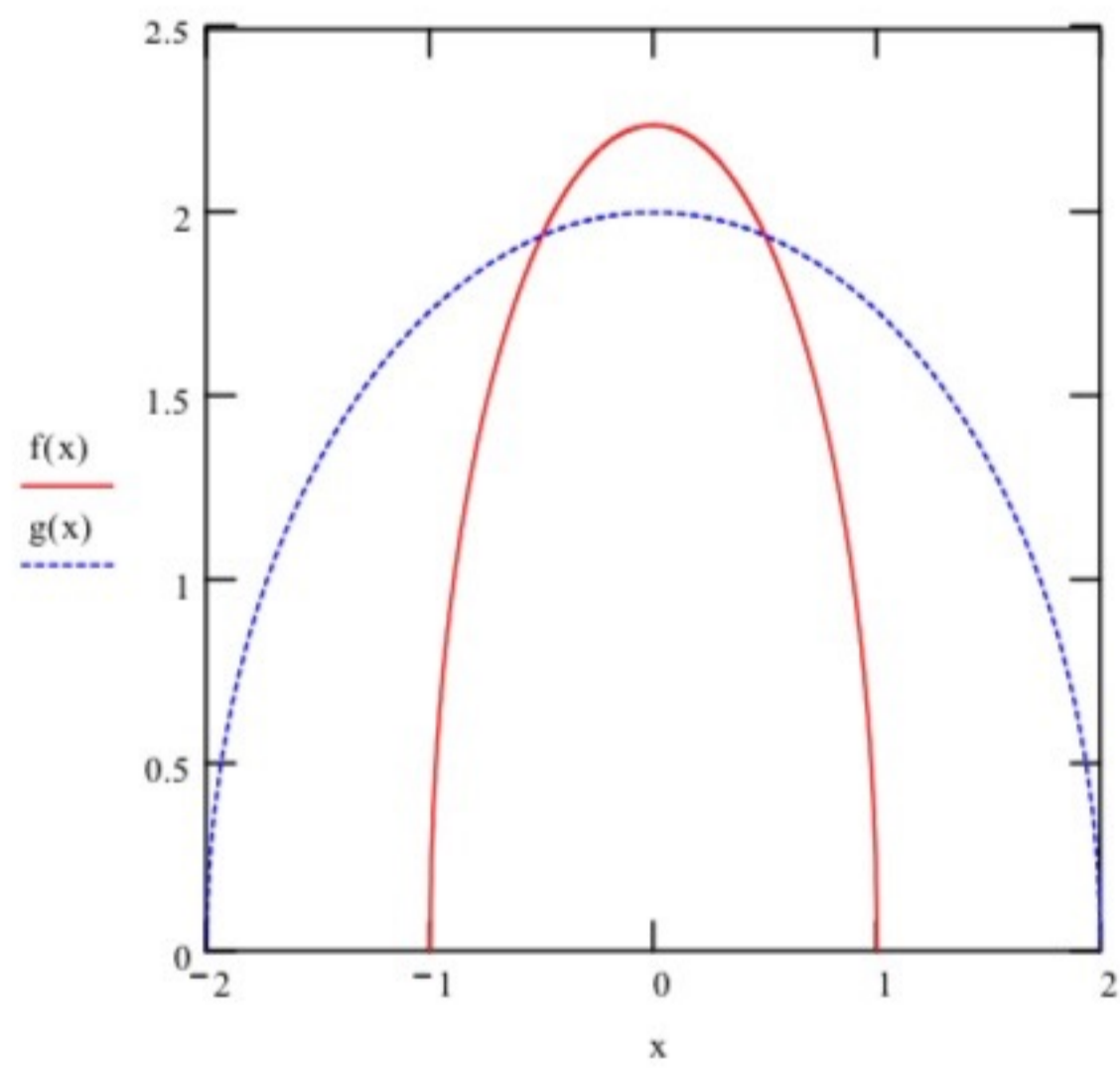


$$g(x) := \sqrt{4 - x^2}$$

$$f(x) := \sqrt{5 - 5x^2}$$



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18/6/2019/007

$$1.) \begin{aligned} 5x^2 + y^2 &= 5 & \text{--- (1)} \\ x^2 + y^2 &= 4 & \text{--- (2)} \end{aligned}$$

Solve it simultaneously.

$$\begin{aligned} 1 \times 5x^2 + y^2 &= 5 \\ 1 \times x^2 + y^2 &= 4 \\ \hline 4x^2 &= 1 \\ 4x^2 &= 1 \\ \hline x^2 &= \frac{1}{4} \end{aligned}$$

$$\frac{4x^2}{4} = \frac{1}{4}$$

$$x^2 = \frac{1}{4} \quad x = \sqrt{\frac{1}{4}} = \frac{1}{2}$$

Substitute $x = \frac{1}{2}$ in (2)

$$\left(\frac{1}{2}\right)^2 + y^2 = 4$$

$$\frac{1}{4} + y^2 = 4$$

$$y = \pm 3\frac{3}{4}$$

$$y = 3\frac{3}{4}, \quad y = \sqrt{\frac{15}{4}}$$

$$y = \frac{15}{2}$$

$$\tan \theta = \frac{dy}{dx}$$

$$5x^2 + y^2 = 5$$

$$10x + 2y \frac{dy}{dx} = 0$$

$$\frac{2y \frac{dy}{dx}}{2y} = -\frac{10x}{2y}$$

$$= -\frac{5x}{y}$$

Substitute $x = \frac{1}{2}$, $y = \sqrt{\frac{15}{2}}$

$$\frac{dy}{dx} = \frac{-5 \left[\frac{1}{2}\right]}{\sqrt{\frac{15}{2}}} = -1.291$$

$$\tan \theta = \frac{dy}{dx}$$

$$\theta = \tan^{-1}(-1.291) = 52.239^\circ$$

$$= x^2 + y^2 = 4$$

$$2x + 2y \frac{dy}{dx} = 0$$

$$\frac{2y \frac{dy}{dx}}{2y} = -\frac{2x}{2y}$$

$$\frac{dy}{dx} = -\frac{x}{y}$$

$$= \frac{1/2}{\sqrt{15/2}} = -0.258$$

$$\frac{dy}{dx} \text{ at } \theta_2 = \frac{dy}{dx}$$

$$\theta_2 = \tan^{-1} \frac{dy}{dx} = -14.467^\circ$$

$$\theta_2 - \theta_1 = -52.239^\circ - (-14.467^\circ)$$

$$= -52.239^\circ + 14.467^\circ$$

$$= -37.772^\circ$$

$$|\theta_2 - \theta_1| = 37.772^\circ$$

$$= 37.77^\circ$$