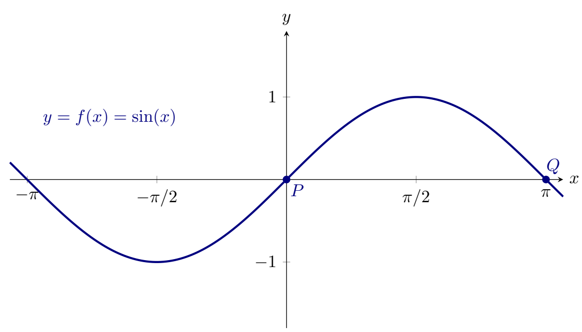
Exercise 1 *The graph of the function f, defined by $f(x) = \sin x$, and two points on the graph of f, P and Q, are given in the figure below.*



(a) *Find an equation of the tangent line to the curve $y = f(x)$ at the point P.*

First, the coordinates of the point P are

$$P = (0, \boxed{0}).$$

In oder to find to find an equation of this tangent line, we need to determine the slope, m.

$$m = f'(\boxed{0}) = \boxed{1},$$

since

$$f'(x) = \boxed{\cos x}.$$

Therefore, the equation of the tangent line to the curve $y = f(x)$ at the point P is given by

$$y = \boxed{1}x.$$

(b) *Find an equation of the tangent line to the curve $y = f(x)$ at the point Q.*

First, the coordinates of the point Q are

$$Q = (\pi, \boxed{0}).$$

In oder to find to find an equation of this tangent line, we need to determine the slope, m.

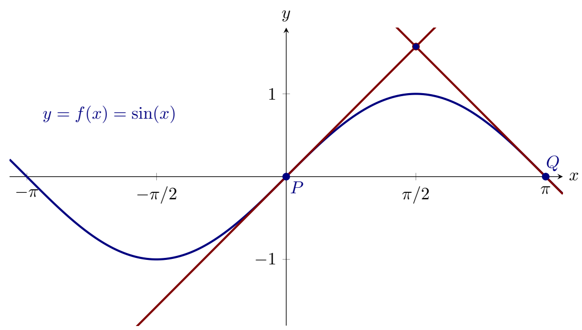
$$m = f'(\boxed{\pi}) = \boxed{-1}.$$

Therefore, the equation of the tangent line to the curve $y = f(x)$ at the point Q is given by

$$y = \boxed{-1}(x - \pi).$$

(c) *The two tangent lines, as defined in part (a) and part (b), are shown in the figure below.*

Find the point of intersection of these two lines or show that such point does NOT exist.



In order to find the point of intersection of these two tangent lines, we have to solve the following system of equations:

$$y = \boxed{1}x$$

$$y = \boxed{-1}(x - \pi).$$

The solution of this system of equations and, therefore, the point of intersection of the two tangent lines is the point

$$(\boxed{\pi/2}, \boxed{\pi/2}).$$