Exercise 21

Find an equation of the tangent line to the curve at the given point.

$$y = \sin x + \cos x, \quad (0, 1)$$

Solution

With one point known on the line, all that we need to know is its slope. This is found by calculating the derivative of the given curve

$$\begin{aligned} y' &= \frac{d}{dx}(\sin x + \cos x) \\ &= \frac{d}{dx}(\sin x) + \frac{d}{dx}(\cos x) \\ &= (\cos x) + (-\sin x) \end{aligned}$$

and evaluating it at $x = 0$.

$$y'(0) = \cos 0 - \sin 0 = 1$$

Therefore, the equation of the tangent line at $(0, 1)$ is

$$y - 1 = 1(x - 0).$$

The tangent line and the given curve are shown below.