

Exercise 35

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

$$y = x + \frac{2}{x}, \quad (2, 3)$$

Solution

Since we have a point on the line, we just need to find the line's slope. The aim, then, is to take the derivative of the given function and evaluate it at the given x -coordinate.

$$\begin{aligned} y' &= \frac{d}{dx} \left(x + \frac{2}{x} \right) \\ &= \frac{d}{dx} (x + 2x^{-1}) \\ &= \frac{d}{dx} (x) + 2 \frac{d}{dx} (x^{-1}) \\ &= (1) + 2(-x^{-2}) \\ &= 1 - 2x^{-2} \end{aligned}$$

As planned, evaluate it at $x = 2$.

$$y'(2) = 1 - 2 \left(\frac{1}{4} \right) = \frac{1}{2}$$

Therefore, the equation of the tangent line to $y = x + 2/x$ at $(2, 3)$ is

$$y - 3 = \frac{1}{2}(x - 2).$$

