CalcStudio Math Documentation

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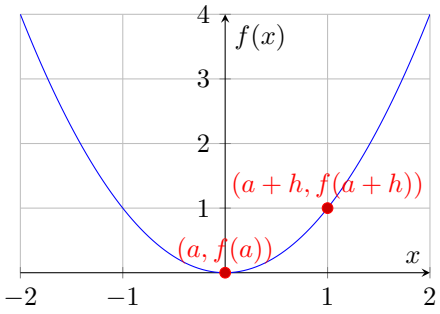
1 Derivative: Tangent Line at Point

A derivative is the instantaneous rate of change of a function. It answers how fast a function is changing at a specific point $x = a$.

This is the formal definition of a limit:

$$f'(a) = \lim_{h \to 0} \frac{f(a+h) - f(a)}{h} \tag{1}$$

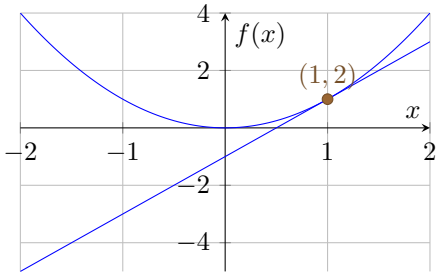


We can decrease h until it is infinitely small. As the distance between the two points (h) approaches 0, we get the instantaneous slope of $f(x)$ at point a.

A tangent line is a line that touches a function at one point and has the same slope as that instantaneous point.

We can model a tangent line like this:

$$y = f(a) + f'(a)(x - a) \tag{2}$$



2 Integral: Area Under a Curve

3 Integral: Riemann Sum Approximation

4 Multivariable: Gradient Descent