The tangent line to a graph

Given a graph $y = f(x)$, we have seen how to calculate the gradient of a tangent line to this graph. We can go further and find the *equation* of a tangent line.

Consider the tangent line to the graph $y = f(x)$ at $x = a$. This line has gradient $f'(a)$ and passes through the point $(a, f(a))$. Once we know a point on the line and its gradient, we can write down its equation:

$$y - f(a) = f'(a)(x - a).$$

(See the module *Coordinate geometry*.)