Derivative Rules and Tangent Lines

Recall that the the *derivative* of a function f is defined by:

$$f'(x) \;=\; \text{the slope of } f \text{ at } x \;=\; \text{the slope of the tangent line at } x$$

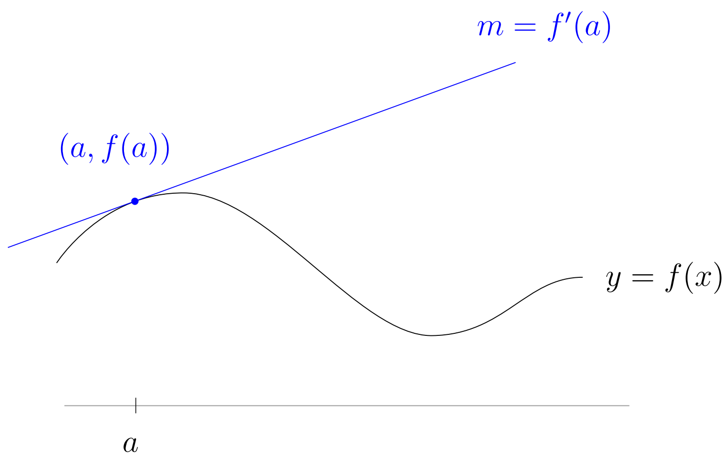
We have the following rules for derivatives. Let b, c, m, and n be constants. Let f and g be functions.

Derivative of a Linear Function:	$(mx+b)' = m$
Derivative of a Constant:	$(c)' = 0$
Derivative of x:	$(x)' = 1$
Power Rule:	$(x^n)' = n \cdot x^{n-1}$
Sum/Difference:	$(f \pm g)' = f' \pm g'$
Constant Multiple:	$(c \cdot f)' = c \cdot (f')$
Product Rule:	$(f \cdot g)' = f' \cdot g + f \cdot g'$
Quotient Rule:	$\left(\frac{f}{g}\right)' = \frac{f' \cdot g - f \cdot g'}{g^2}$

Given a function $f(x)$, the tangent line at $x = a$:

i) goes through the point $(a, f(a))$

ii) has slope $m = f'(a)$



To find the equation of such a tangent line, we may use the two facts above, along with either point-slope or slope-intercept form.