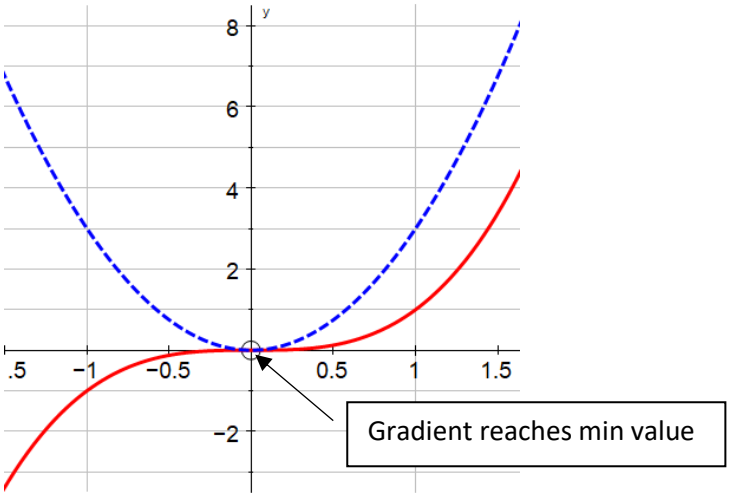
Points of Inflection

A point of inflection is where the gradient (not the graph itself) takes a local max/min value. At a point of inflection, the shape of a graph changes from a *concave upwards* to a *concave downwards* curve, or vice versa.

Usually, at a point of inflection, $\frac{d^2y}{dx^2} = 0$, but this is not always the case.
Points of inflection can be *stationary points of inflection* or *non-stationary points of inflection*.

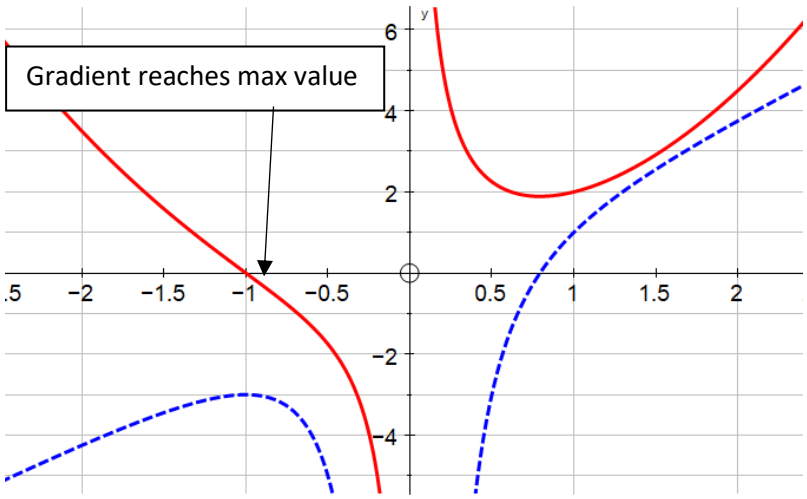
Stationary Point of Inflection

In the example below, where $y = x^3$, there is a stationary inflection point.
I.e. at the point of inflection, the gradient also zero and $\frac{dy}{dx} = 0$.



Non-Stationary Point of Inflection

In the example below, where $y = x + \frac{1}{x}$, there is a non-stationary inflection point.
I.e. at the point of inflection, the gradient is not zero and $\frac{dy}{dx} \neq 0$.



	$\frac{dy}{dx} = 0$	$\frac{dy}{dx} \neq 0$
$\frac{d^2y}{dx^2} > 0$	Stationary point, minimum	
$\frac{d^2y}{dx^2} = 0$	Stationary point of inflection	Non-stationary point of inflection
$\frac{d^2y}{dx^2} < 0$	Stationary point, maximum	