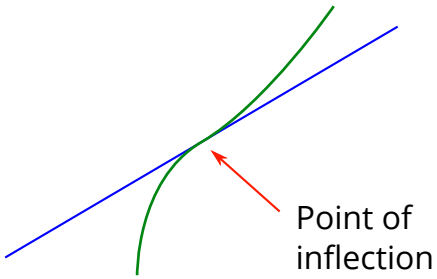
Point of inflection

underground mathematics

An *inflection point*, or *point of inflection*, is a point on a curve where the curve crosses its tangent at that point. For the graph of a function, another way of expressing this is that the second derivative is positive on one side of the point and negative on the other side.



For example, if $y = x^3 + x^2 + x + 1$ then $\frac{d^2y}{dx^2} = 6x + 2$, which changes from negative to positive when $x = -\frac{1}{3}$. Therefore $y = x^3 + x^2 + x + 1$ has a point of inflection when $x = -\frac{1}{3}$.

Some points to note:

- A point of inflection may also be a stationary point, but it doesn't have to be.
- The second derivative will be zero at a point of inflection (if it is defined there).
- If the second derivative is zero at a point, the point may or may not be a point of inflection.

More generally, a point of inflection on a curve is a place where the curvature changes from positive to negative or negative to positive. If you imagine walking along an S-shaped path, at some point you will change from turning to the left to turning to the right. This is a point of inflection.