Graphing Derivatives

We can relate the graph of a function with its derivative. To do so, remember:

i) The derivative of a function represents the slope of the tangent line of the function at any defined point, x.

ii) For polynomial functions, each time we differentiate we reduce the degree of the polynomial by 1.

Notes:

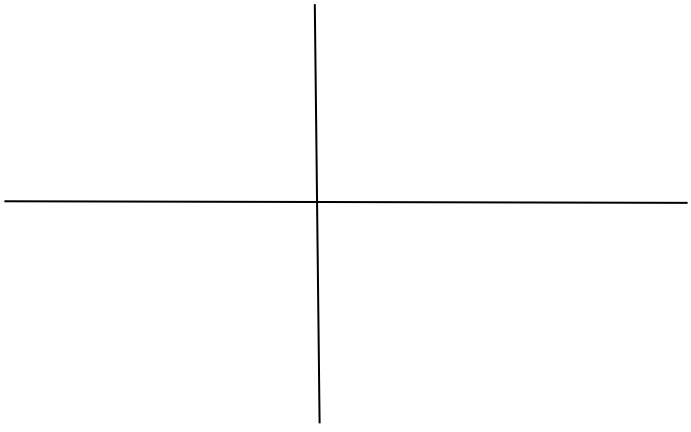
1. **If the slope of the tangent is negative at point** $x = a$ **(ie:** $f'(x) < 0$**), then the derivative graph is below the** $x-$ **axis.**

2. **If the slope of the tangent is positive at point** $x = a$ **(ie:** $f'(x) > 0$**), then the derivative graph is above the** $x-$ **axis.**

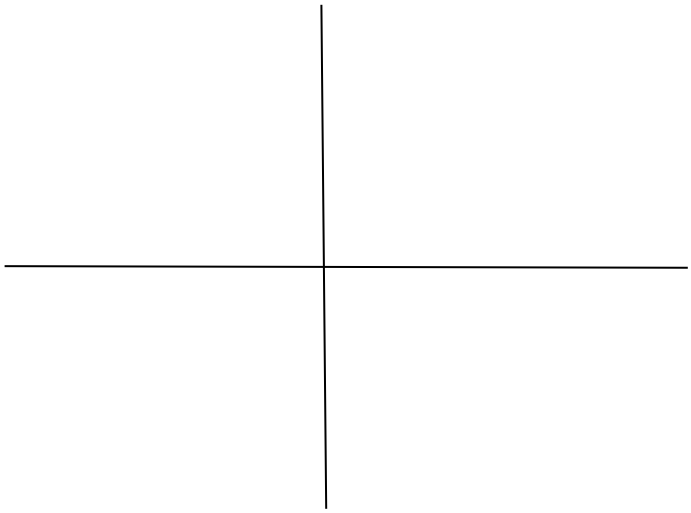
3. **If the slope of the tangent is zero at point** $x = a$ **(ie:** $f'(x) = 0$**), then the derivative graph is on the** $x-$ **axis.**

Example 1: For each of the following graphs of $f(x)$ **sketch the derivative function,** $f'(x)$**.**

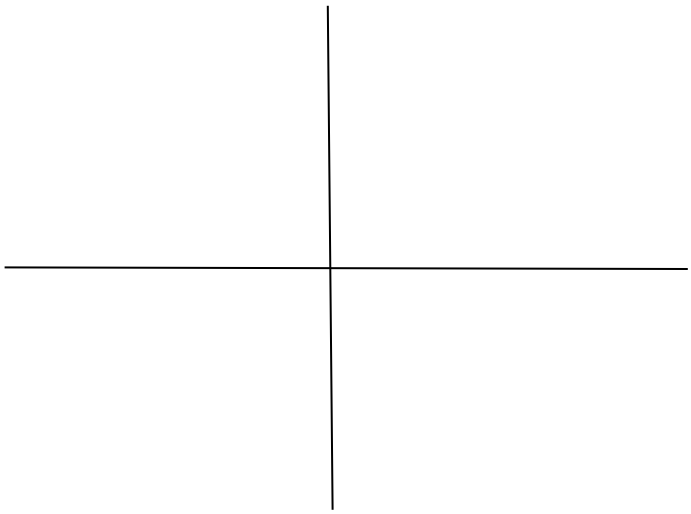
a)



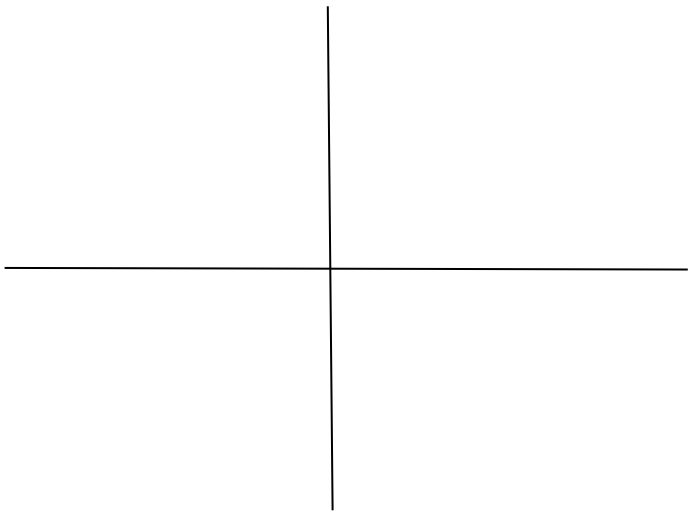
b)



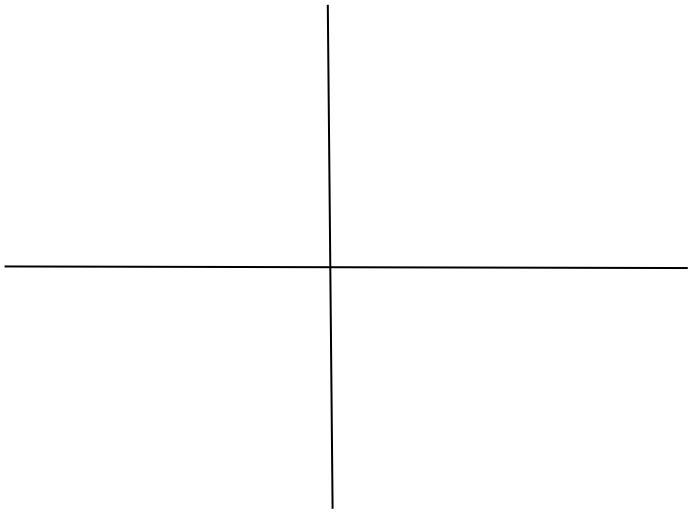
c)



d)



e)



Example 2: **Given $f'(x)$ below, sketch a possible curve for $f(x)$.**