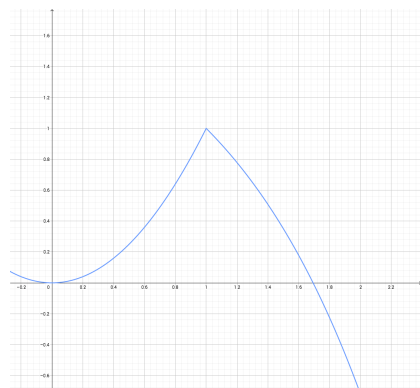


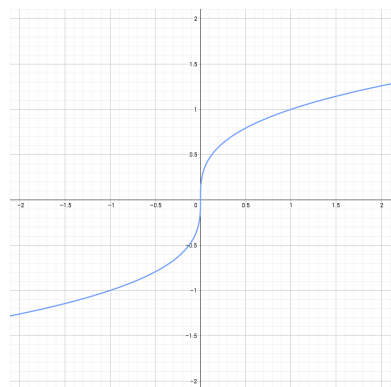
The goal of this exercise is to explore and determine the cases where a function fails to have a derivative at a point.

Consider the following graphs. For each of them, indicate the point(s) for which the function fails to be differentiable and give a short explanation of why it fails to be differentiable.

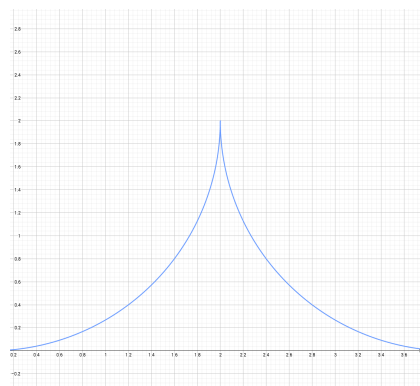
1.



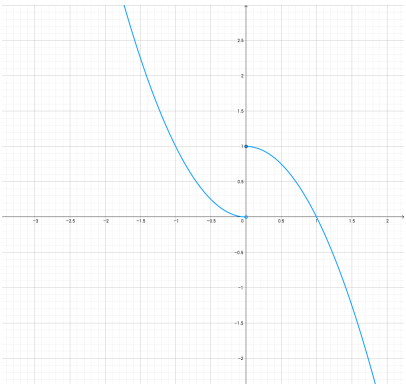
2.



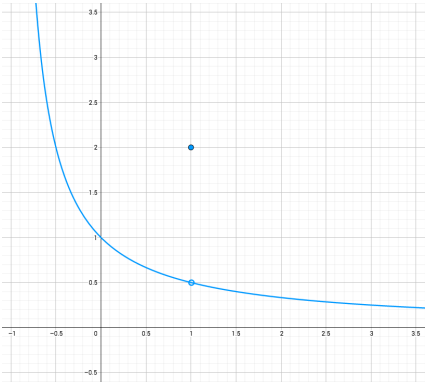
3.



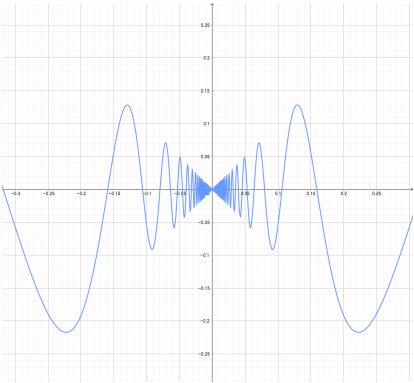
4.



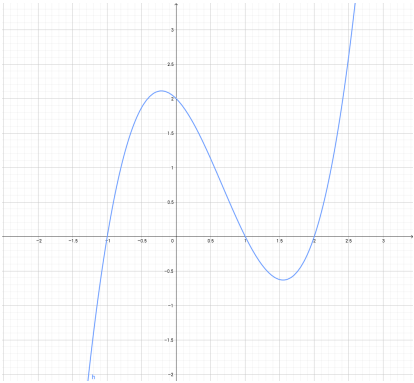
5.



6.



7.



We have seen that the definition of the derivative at a point  $x$  is given by

$$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h} = \lim_{z \rightarrow x} \frac{f(z) - f(x)}{z - x}.$$

For the cases [1](#), [2](#), [3](#), and [6](#) above, explain what happens in terms of this limit.