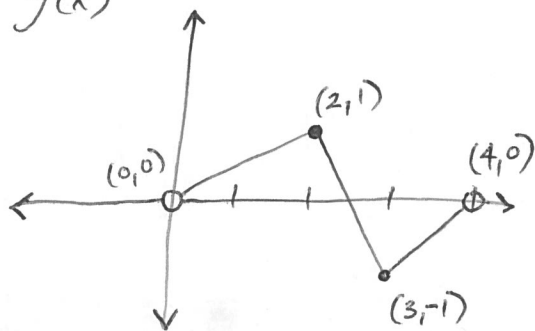(a) Give the definition of the derivative of a function f at a point a.

$$f'(a) = \lim_{h \to 0} \frac{f(a+h) - f(a)}{h}$$

(b) Suppose that f is a function with the graph

$y = f(x)$

with f defined on the domain $(0,4)$. Give a formula (or formulae!) for the derivative f' and give the domain of f'.

The domain of f' is $(0,2) \cup (2,3) \cup (3,4)$, or all real numbers from 0 to 4 except 2 and 3.

$$f'(x) = \begin{cases} \frac{1}{2} & \text{if } 0 < x < 2 \\ -2 & \text{if } 2 < x < 3 \\ 1 & \text{if } 3 < x < 4 \end{cases}$$