

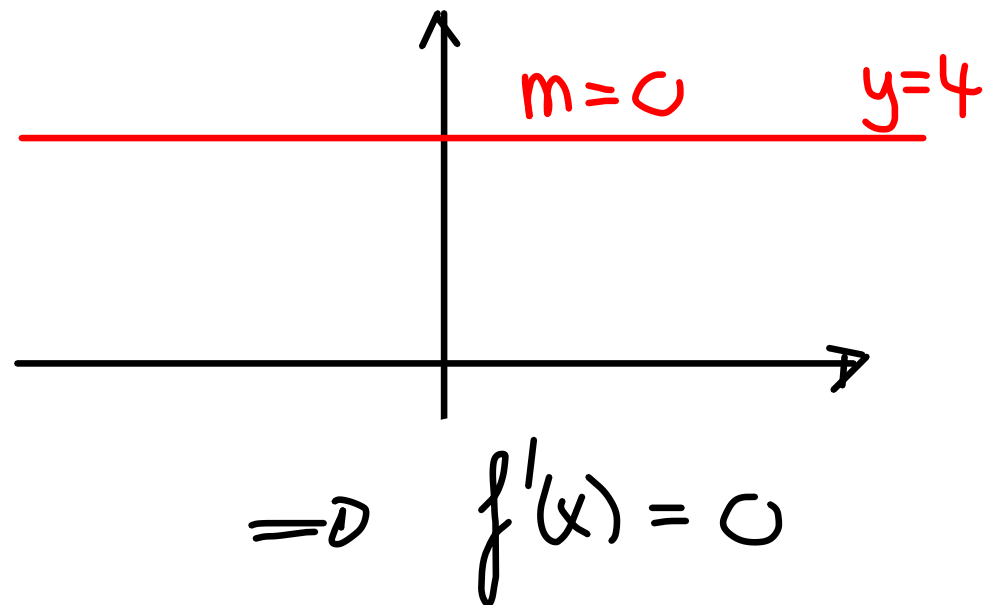
# Ex 2.8.1

$$f'(a) = \lim_{x \rightarrow a} \frac{f(x) - f(a)}{x - a}$$

a)  $f(x) = 4$

$$f'(a) = \lim_{x \rightarrow a} \frac{4 - 4}{x - a} = \lim_{x \rightarrow a} 0 = 0$$

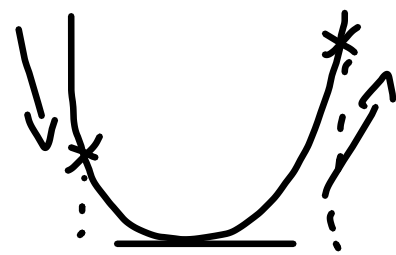
$$\Rightarrow \underline{f'(x) = 0}$$



b)  $f(x) = 2x - 5$

$$f'(a) = \lim_{x \rightarrow a} \frac{2x - 5 - (2a - 5)}{x - a} = \lim_{x \rightarrow a} \frac{2x - 2a}{x - a}$$

$$= \lim_{x \rightarrow a} \frac{2(x - a)}{x - a} = 2 \quad \Rightarrow \underline{f'(x) = 2}$$



c)  $f(x) = x^2 + 1$

$$f'(a) = \lim_{x \rightarrow a} \frac{(x^2 + 1) - (a^2 + 1)}{x - a}$$

$$= \lim_{x \rightarrow a} \frac{x^2 - a^2}{x - a} \stackrel{\text{"a/c"}}{=} \lim_{x \rightarrow a} \frac{(x+a)\cancel{(x-a)}}{\cancel{x-a}} = \lim_{x \rightarrow a} (x+a) = a+a = 2a$$

$$\Rightarrow \underline{f'(x) = 2x}$$