

$$1) y = f(x) = 5 \rightarrow \text{funzione costante}$$

funzione costante

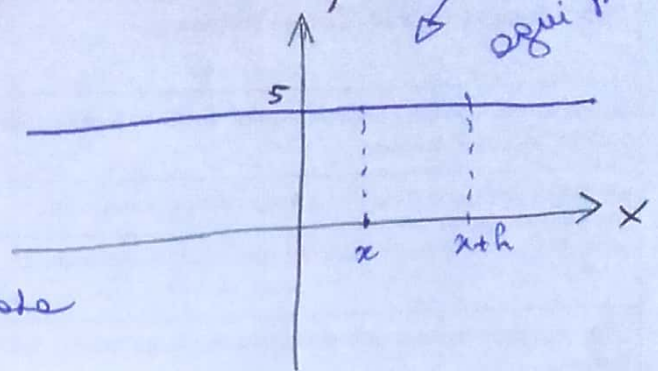
$$\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h} = f'(x)$$

$$f(x+h) = 5$$

(che qui coincide con la retta)
 la tangente
 la pendenza
 nulla in
 ogni punto

$$\lim_{h \rightarrow 0} \frac{5 - 5}{h} = 0$$

$$\Rightarrow f'(x) = 0 \rightarrow \text{funzione derivata}$$



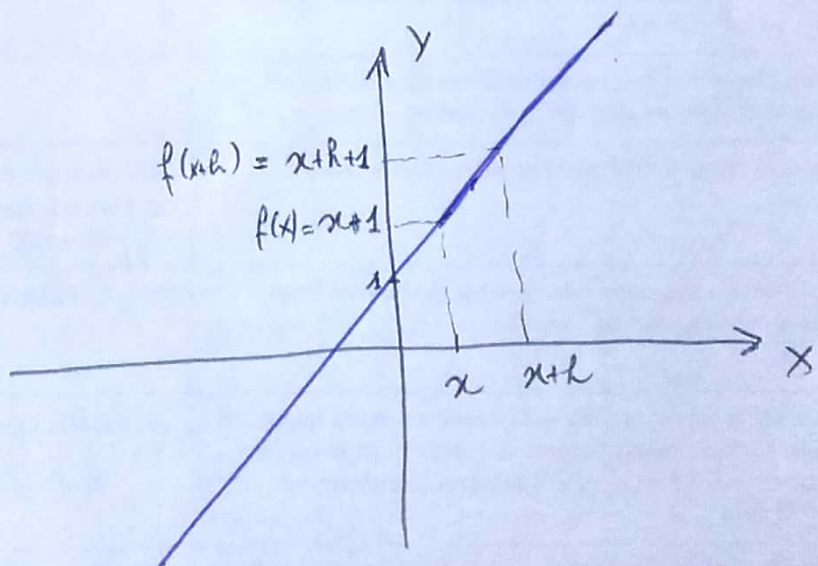
$$2) y = f(x) = x + 1$$

$$f(x+h) = x+h+1$$

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

$$\lim_{h \rightarrow 0} \frac{x+h+1 - x-1}{h} = \lim_{h \rightarrow 0} \frac{h}{h} = 1$$

$$\Rightarrow f'(x) = 1$$



la tangente (che qui coincide con la retta)
 la pendenza positiva in ogni punto

$$3) y = f(x) = x^2$$

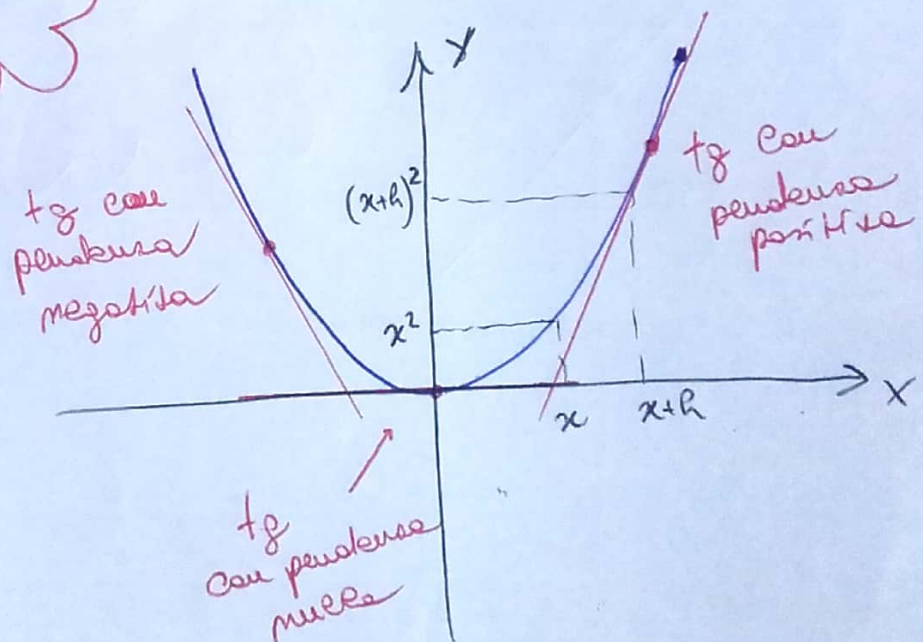
$$f(x+h) = (x+h)^2$$

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

$$\lim_{h \rightarrow 0} \frac{(x+h)^2 - x^2}{h} = \lim_{h \rightarrow 0} \frac{x^2 + h^2 + 2hx - x^2}{h} =$$

$$= \lim_{h \rightarrow 0} \frac{h(h + 2x)}{h} = 2x$$

$$\Rightarrow f'(x) = 2x$$



NOTA BENE

$$2x > 0 \quad \text{per } x > 0$$

$$2x < 0 \quad \text{per } x < 0$$

$$2x = 0 \quad \text{per } x = 0$$