

# DERIVATE DI ALCUNE FUNZIONI ELEMENTARI

## • FUNZIONE COSTANTE

$$f(x) = k$$

$$D(k) = 0$$

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

$$= \lim_{h \rightarrow 0} 0 = 0$$

## • FUNZIONE IDENTICA

$$f(x) = x$$

$$D(x) = 1$$

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

$$= \lim_{h \rightarrow 0} \frac{h}{h} = 1$$

## • FUNZIONE SENO

$$f(x) = \sin x$$

$$D(\sin x) = \cos x$$

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

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

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

$$= \sin x \lim_{h \rightarrow 0} \frac{\cos^2 h - 1}{h(\cos h + 1)} + \cos x =$$

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

$$= \cos x$$

## • FUNZIONE COSENO

$$f(x) = \cos x$$

$$D(\cos x) = -\sin x$$

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

$$= \lim_{h \rightarrow 0} \frac{\cos x \cos h - \sin x \sin h - \cos x}{h} =$$

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

$$= -\sin x$$