

Tabella punti di non derivabilità

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Sappiamo che una funzione $f : [a, b] \rightarrow \mathbb{R}$ è derivabile in $x_0 \in (a, b)$ se

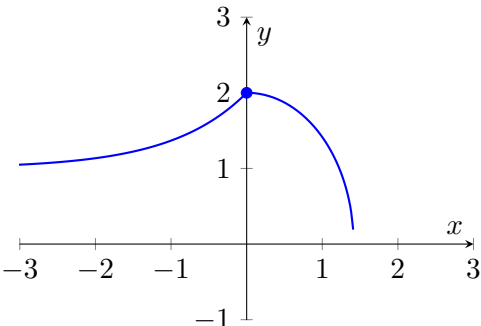
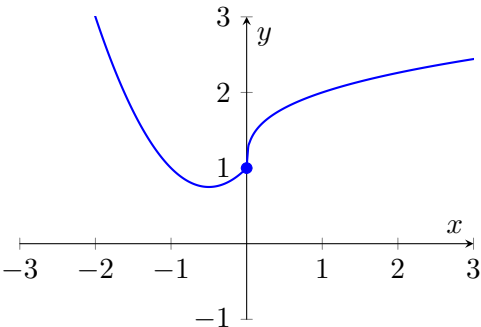
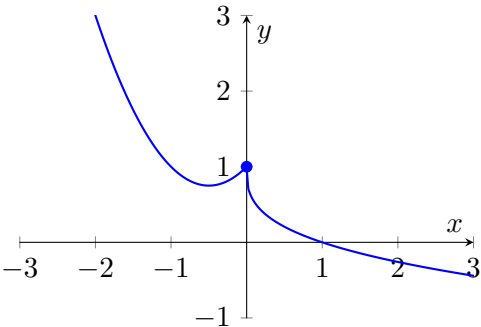
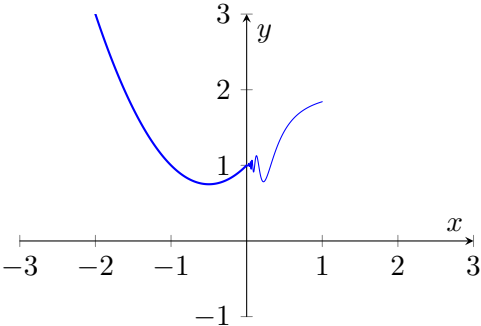
$\lim_{h \rightarrow 0^-} \frac{f(x_0 + h) - f(x_0)}{h} = \lim_{h \rightarrow 0^+} \frac{f(x_0 + h) - f(x_0)}{h} = l \in \mathbb{R}$ e in tal caso scriveremo che $l = f'(x_0)$. In poche parole il rapporto incrementale deve avere limite finito in x_0 .

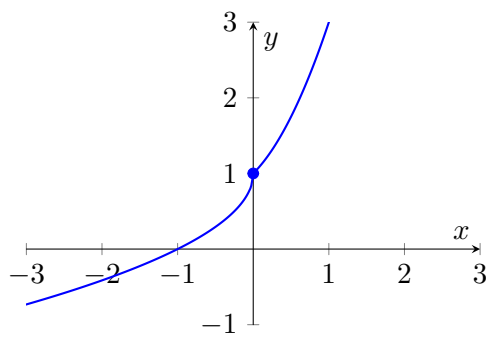
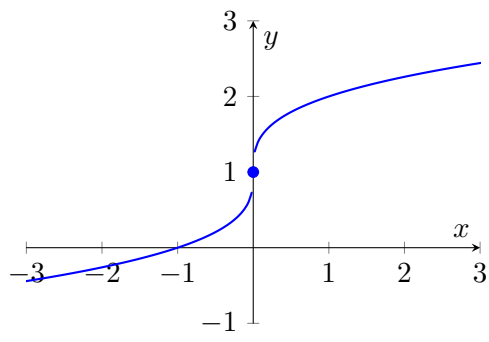
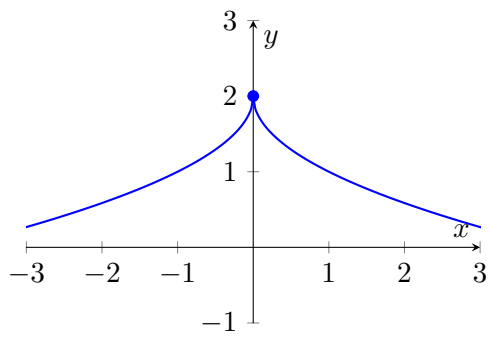
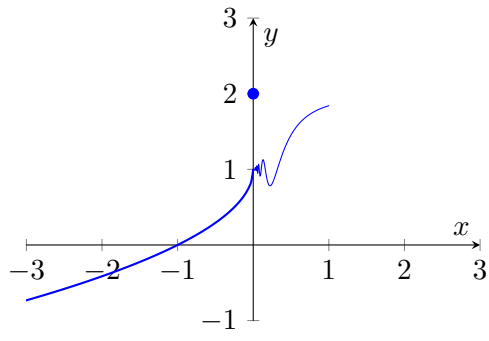
Se la funzione in x_0 pur essendo continua non è derivabile vuol dire che il *rapporto incrementale* non deve ammettere limite e a tal proposito si possono presentare le seguenti eventualità in x_0 :

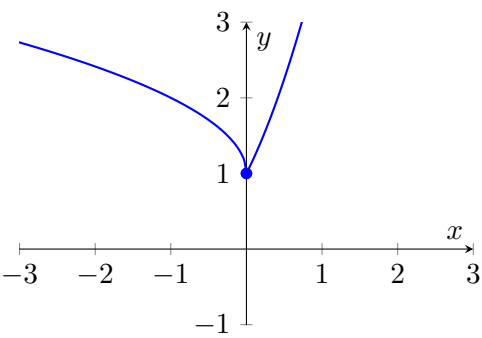
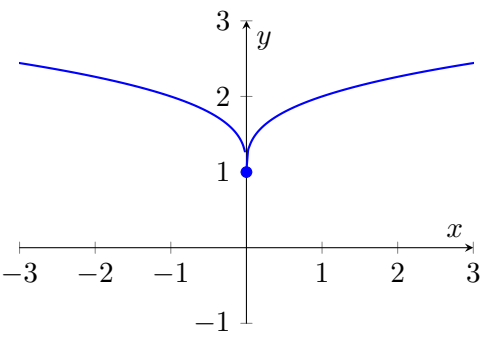
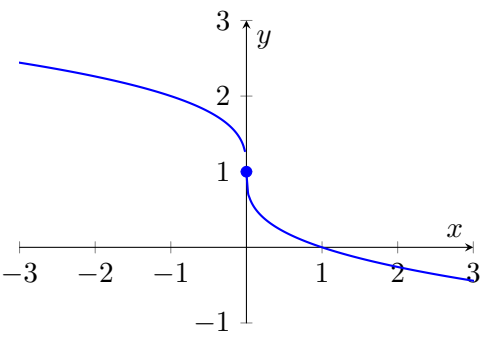
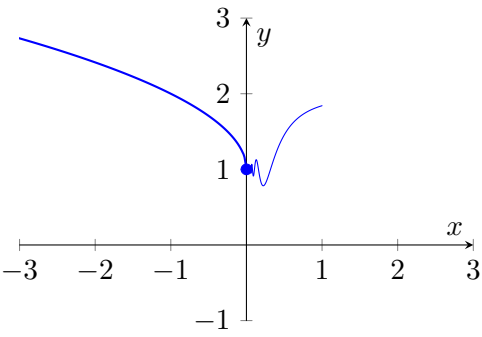
Le definizioni in rosso che si trovano nelle prossime pagine non sono ufficiali, sono state etichettate dal sottoscritto ma non ci sta nulla di sbagliato!!!.

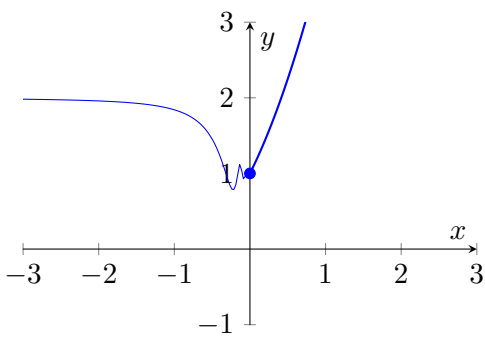
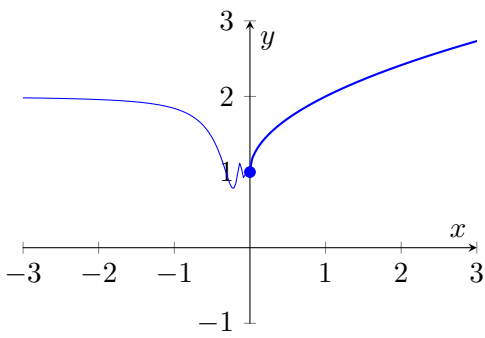
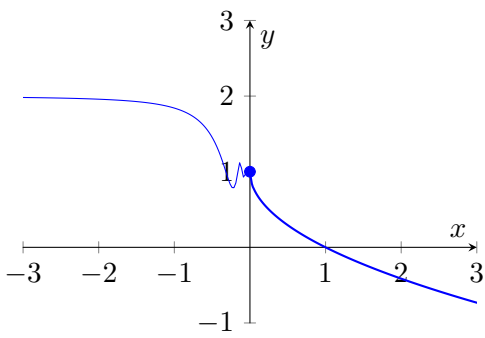
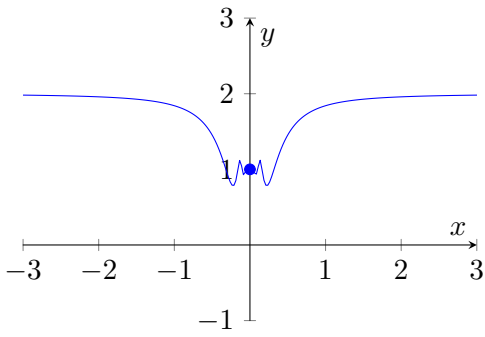
Nelle prossime pagine con tanto zelo presenteremo tutti i casi possibili:

$f'_-(x_0)$	$\longrightarrow$	$l_1 \in \mathbb{R}$	$-\infty$	$+\infty$	$\nexists$
$f'_+(x_0)$	$\longrightarrow$	$l_2 \in \mathbb{R}$	$-\infty$	$+\infty$	$\nexists$

$f'_-(x_0)$	$f'_+(x_0)$	Tipologia	Grafico
$l_1 \in \mathbb{R}$	$l_2 \in \mathbb{R}$	Punto Angoloso	
l_1	$+\infty$	Semicuspide a destra o Punto angoloso a sinistra	
l_1	$-\infty$	Semicuspide a destra o Punto angoloso a sinistra	
l_1	$\nexists$	Punto angoloso a sinistra con irregolarità a destra	

$f'_-(x_0)$	$f'_+(x_0)$	Tipologia	Grafico
$+\infty \in \mathbb{R}$	$l_2 \in \mathbb{R}$	Semicuspide a sinistra o punto angoloso a destra	
$+\infty$	$+\infty$	Flesso a tangente verticale decrescente o discendente	
$+\infty$	$-\infty$	Punto di Cuspide verso l'alto	
$+\infty$	$\nexists$	Semicuspide a sinistra con irregolarità a destra	

$f'_-(x_0)$	$f'_+(x_0)$	Tipologia	Grafico
$-\infty \in \mathbb{R}$	$l_2 \in \mathbb{R}$	Semicuspide a sinistra o punto angoloso a destra	 A Cartesian coordinate system showing a blue curve. The x-axis ranges from -3 to 3, and the y-axis ranges from -1 to 3. The curve approaches a point at (0,1) from the left with a vertical tangent (slope approaching -infinity). From (0,1), the curve goes up and to the right with a finite slope, passing through approximately (1, 3).
$-\infty$	$+\infty$	Cuspide verso il basso	 A Cartesian coordinate system showing a blue curve. The x-axis ranges from -3 to 3, and the y-axis ranges from -1 to 3. The curve approaches a point at (0,1) from both the left and right with vertical tangents (slope approaching -infinity).
$-\infty$	$-\infty$	Flesso a tangente verticale crescente o ascendente	 A Cartesian coordinate system showing a blue curve. The x-axis ranges from -3 to 3, and the y-axis ranges from -1 to 3. The curve passes through (0,1) with a vertical tangent. For x < 0, the curve is above y=1 and concave down. For x > 0, the curve is below y=1 and concave up, passing through (1,0).
$-\infty$	$\nexists$	Semicuspide a sinistra con irregolarita a destra	 A Cartesian coordinate system showing a blue curve. The x-axis ranges from -3 to 3, and the y-axis ranges from -1 to 3. The curve approaches a point at (0,1) from the left with a vertical tangent (slope approaching -infinity). From (0,1), the curve goes down and to the right, exhibiting a small loop-like irregularity before continuing upwards.

$f'_-(x_0)$	$f'_+(x_0)$	Tipologia	Grafico
$\nexists \in \mathbb{R}$	$l_2 \in \mathbb{R}$	Punto angoloso a destra con irregolarità a sinistra	 The graph shows a function on a coordinate system with x and y axes ranging from -3 to 3. The function has a sharp corner at the origin (0,1), where the left-hand derivative is vertical (undefined) and the right-hand derivative is a straight line with a positive slope. The function is concave up for x < 0 and concave down for x > 0.
$\nexists \in \mathbb{R}$	$+\infty \in \mathbb{R}$	Semicuspide a destra con irregolarità a sinistra	 The graph shows a function on a coordinate system with x and y axes ranging from -3 to 3. The function has a cusp at the origin (0,1), where both the left-hand and right-hand derivatives are vertical (undefined). The function is concave up for x < 0 and concave down for x > 0.
$\nexists \in \mathbb{R}$	$-\infty \in \mathbb{R}$	Semicuspide a destra con irregolarità a sinistra	 The graph shows a function on a coordinate system with x and y axes ranging from -3 to 3. The function has a cusp at the origin (0,1), where both the left-hand and right-hand derivatives are vertical (undefined). The function is concave up for x < 0 and concave down for x > 0.
$\nexists$	$\nexists$	Punto irregolare	 The graph shows a function on a coordinate system with x and y axes ranging from -3 to 3. The function has a cusp at the origin (0,1), where both the left-hand and right-hand derivatives are vertical (undefined). The function is concave up for x < 0 and concave down for x > 0.