$$f(x)=\frac{x+1}{(x-2)^2}$$

1. **Dominio :** $\forall\, x \in \Re : x-2>0 \quad \Rightarrow \quad x \neq 2$

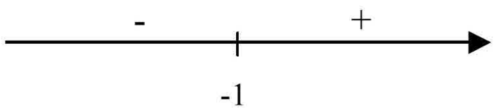
1. **Intersezioni Assi :**

$$\begin{cases} y=\dfrac{x+1}{(x-2)^2} \\ x=0 \end{cases} \Rightarrow \begin{cases} y=\dfrac{1}{4} \\ x=0 \end{cases}$$

$$\begin{cases} y=\dfrac{x+1}{(x-2)^2} \\ y=0 \end{cases} \Rightarrow \begin{cases} x+1=0 \\ y=0 \end{cases} \Rightarrow \begin{cases} x=-1 \\ y=0 \end{cases}$$

3. **Segno :**

$$f(x)>0 \qquad \frac{x+1}{(x-2)^2}>0 \Rightarrow x>-1$$



4. **Limiti :**

$$\lim_{x\to-\infty} \frac{x+1}{(x-2)^2}=\left(\frac{-\infty}{+\infty}\right) \Rightarrow H \lim_{x\to-\infty} \frac{1}{2(x-2)}=0$$

$$\lim_{x\to+\infty} \frac{x+1}{(x-2)^2}=\left(\frac{+\infty}{+\infty}\right) \Rightarrow H \lim_{x\to-\infty} \frac{1}{2(x-2)}=0$$

$$\lim_{x\to2} \frac{x+1}{(x-2)^2}=+\infty$$

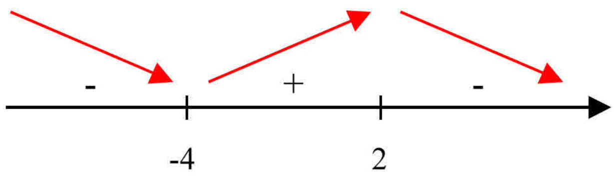
5. Asintoti :

$x = 2$ **asintoto verticale** $y = 0$ **asintoto orizzontale**

6. Derivata 1^ :

$$f'(x) = \frac{(x-2)^2 - 2(x+1)(x-2)}{(x-2)^4} = \frac{(x-2)(x-2-2x-2)}{(x-2)^4} = \frac{-x-4}{(x-2)^3}$$

$$f'(x) > 0 \quad \Rightarrow \quad \frac{-x-4}{(x-2)^3} > 0 \quad \Rightarrow \quad -4 < x < 2$$

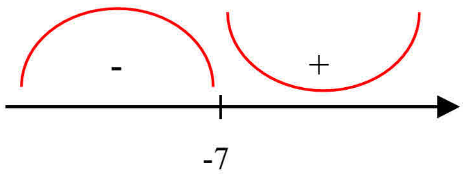


$f(-4) = -\frac{1}{12}$ $\quad P_1 = \left(-4\,, -\frac{1}{12}\right)$ punto di **minimo assoluto** per f

7. Derivata 2^ :

$$f''(x) = \frac{-(x-2)^3 - 3(-x-4)(x-2)^2}{(x-2)^6} = \frac{(x-2)^2(-x+2+3x+12)}{(x-2)^4} = \frac{2x+14}{(x-2)^4}$$

$$f''(x) > 0 \quad \Rightarrow \quad 2x+14 > 0 \quad \Rightarrow \quad x > -7$$



$f(-7) = -\frac{2}{27}$ $\quad P_2 = \left(-7 \, , -\frac{2}{27} \right)$ punto di **flesso** per f

Riassumendo :

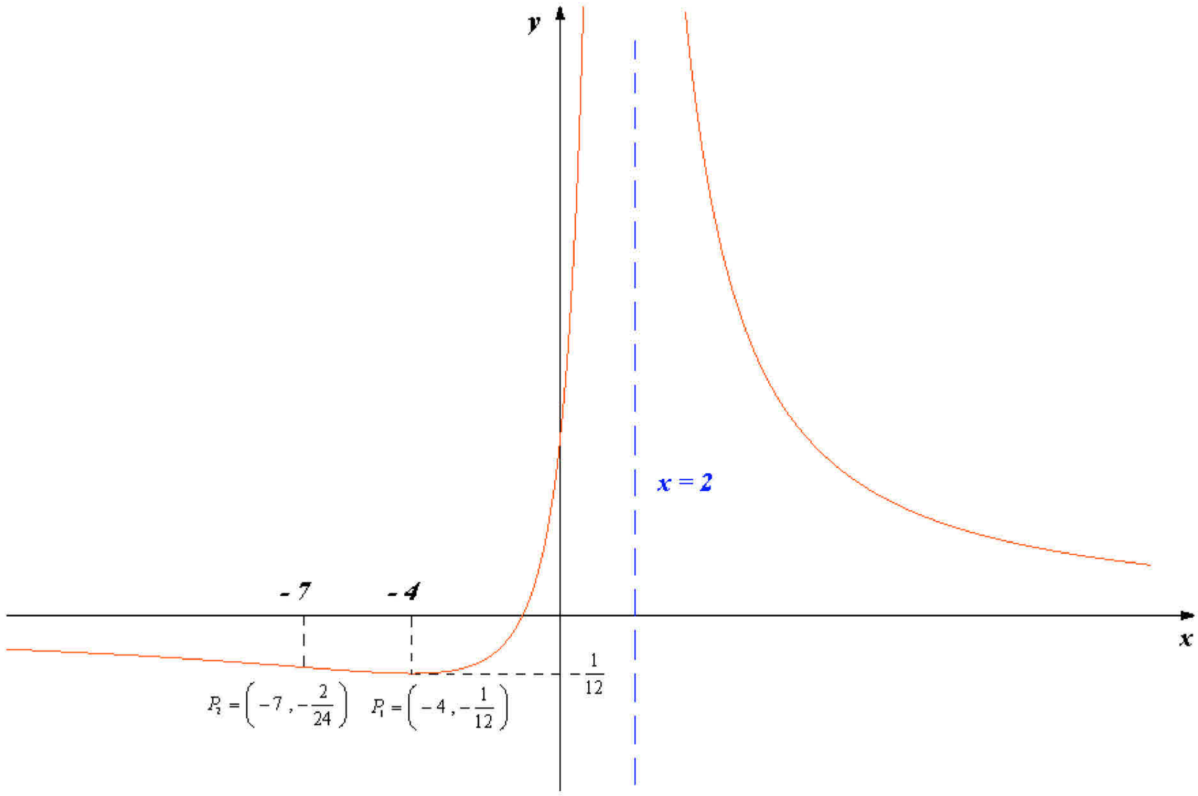
$f(x)$ ha **dominio** in $]-\infty\, , 2\, [\cup]\, 2\, , +\infty\, [$ con una **discontinuità di 2^ specie** in $x = 2$

$f(x)$ è **continua** in $]-\infty\, , 2\, [\cup]\, 2\, , +\infty\, [$ con una **discontinuità di 2^ specie** in $x = 2$

$f(x)$ è **monotòna decrescente** in $]-\infty\, , -4\, [\cup]\, 2\, , +\infty\, [$, **monotòna crescente** $[-4\, , 2\, [$,

con un **minimo assoluto** in $x = -4$

$f(x)$ è **concava** in $]-\infty\, , -7\, [$, **convessa in** $[-7\, , 2\, [\cup]\, 2\, , +\infty\, [$ con un **flesso** in $x = -7$



y
x
x = 2
- 7
- 4
1
12
$P_2 = \left(-7, -\frac{2}{24}\right)$
$P_1 = \left(-4, -\frac{1}{12}\right)$