

Dadas las siguientes funciones, hallar las derivadas primera y segunda. (Se muestran las soluciones).  
(Se puede proceder después a estudiar dominio, continuidad, ramas infinitas y asíntotas, crecimiento concavidad y graficar todas las funciones.)

FUNCIÓN	DERIVADA 1era.	DERIVADA 2da.
$a(x) = L\left(\frac{x-1}{x+4}\right)$	$a'(x) = \frac{5}{(x-1)(x+4)}$	$a''(x) = \frac{-5(2x+3)}{(x-1)^2(x+4)^2}$
$b(x) = \frac{x-1}{x+4}$	$b'(x) = \frac{5}{(x+4)^2}$	$b''(x) = \frac{-10}{(x+4)^3}$
$c(x) = L\left \frac{x-1}{x+4}\right $	$c'(x) = a'(x)$	$c''(x) = a''(x)$
$d(x) = L\left(\frac{(x-5)^3}{x-2}\right)$	$d'(x) = \frac{2x-1}{(x-2)(x-5)}$	$d''(x) = \frac{-2x^2+2x+13}{(x-2)^2(x-5)^2}$
$f(x) = e^x(x^2-4x)$	$f'(x) = e^x(x^2-2x-4)$	$f''(x) = e^x(x^2-6)$
$g(x) = e^{2x}(x^2-4x)$	$g'(x) = e^{2x}(2x^2-6x-4)$	$g''(x) = e^{2x}(4x^2-8x-14)$
$h(x) = \begin{cases} e^{-\frac{x}{2}}(3-x) & \text{para } x \leq 4 \\ \sqrt{x^2-1} & \text{para } x > 4 \end{cases}$	$h'(x) = \begin{cases} e^{-\frac{x}{2}}\left(\frac{-x^2-2x+6}{x^2}\right) \\ \frac{x}{\sqrt{x^2-1}} \end{cases}$	$h''(x) = \begin{cases} e^{-\frac{x}{2}}\frac{(12-16x)}{x^4} \\ \frac{-1}{\sqrt{(x^2-1)^3}} \end{cases}$
$j(x) =  x^2-x-6 +x-5$	$j'(x) = \begin{cases} 2x & ; x < -2 \vee x > 3 \\ -2x+2 & ; -2 < x < 3 \end{cases}$	$j''(x) = \begin{cases} 2 & ; x < -2 \vee x > 3 \\ -2 & ; -2 < x < 3 \end{cases}$
$m(x) = \frac{x}{x^2-1}$	$m'(x) = \frac{-x^2-1}{(x^2-1)^2}$	$m''(x) = \frac{2x(x^2+3)}{(x^2-1)^3}$
$n(x) = \frac{2x^2-x-6}{3x} - Lx$	$n'(x) = \frac{2x^2-3x+6}{3x^2}$	$n''(x) = \frac{x-4}{x^3}$
$p(x) = \frac{x^2+x}{e^x}$	$p'(x) = \frac{-x^2+x+1}{e^x}$	$p''(x) = \frac{x^2-3x}{e^x}$
$q(x) = e^x(2x^2-3x)$	$q'(x) = e^x(2x^2+x-3)$	$q''(x) = e^x(2x^2+5x-2)$
$r(x) = L\left(\frac{x^2}{x^2+1}\right) - x + 2$	$r'(x) = \frac{-x^3-x+2}{x(x^2+1)}$	$r''(x) = \frac{6x^2+2}{x^2(x^2+1)^2}$
$s(x) = e^{-\frac{1}{x+2}}\left(\frac{-x-8}{x+2}\right)$	$s'(x) = e^{-\frac{1}{x+2}}\left(\frac{5x+4}{(x+2)^3}\right)$	$s''(x) = e^{-\frac{1}{x+2}}\left(\frac{-10x^2-17x}{(x+2)^5}\right)$
$t(x) = \frac{x^2+3}{x} - L\left \frac{x-2}{x}\right $	$t'(x) = \frac{x^3-2x^2-5x+6}{x^2(x-2)}$	$t''(x) = \frac{10x^2-28x+24}{x^3(x-2)^2}$
$u(x) = \frac{3x^2-5x-2}{x-1}$	$u'(x) = \frac{3x^2-6x+7}{(x-1)^2}$	$u''(x) = \frac{-8}{(x-1)^3}$
$v(x) = \sqrt{x^2+6x-5}$	$v'(x) = \frac{x+3}{\sqrt{x^2+6x-5}}$	$v''(x) = \frac{-14}{\sqrt{(x^2+6x-5)^3}}$