Příklad 2.6

$with(plots):$
$with(Student):$
$with(Student[Calculus1]):$
$f := \left(\frac{ln\left(2 \cdot x^3 + 4 \cdot x^2 - x\right)}{x+1}\right):$

(1)

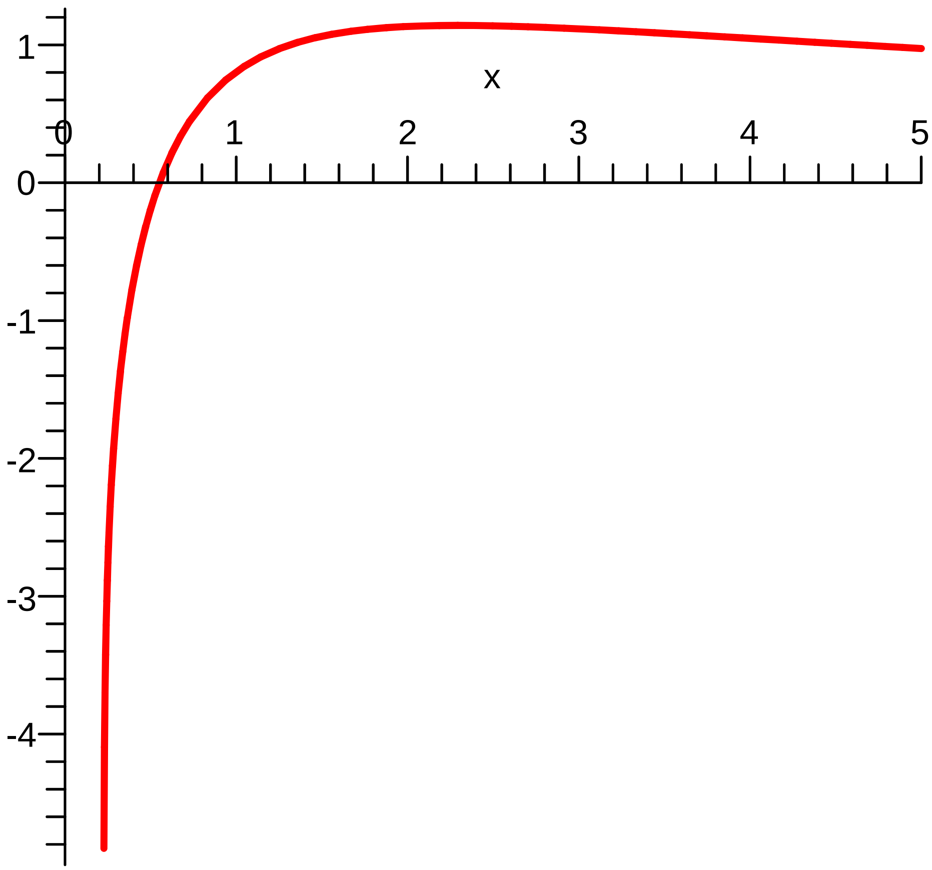
$f1 := diff(f, x);$

$$\frac{6x^2 + 8x - 1}{\left(2x^3 + 4x^2 - x\right)(x+1)} - \frac{\ln\left(2x^3 + 4x^2 - x\right)}{(x+1)^2} \quad (2)$$

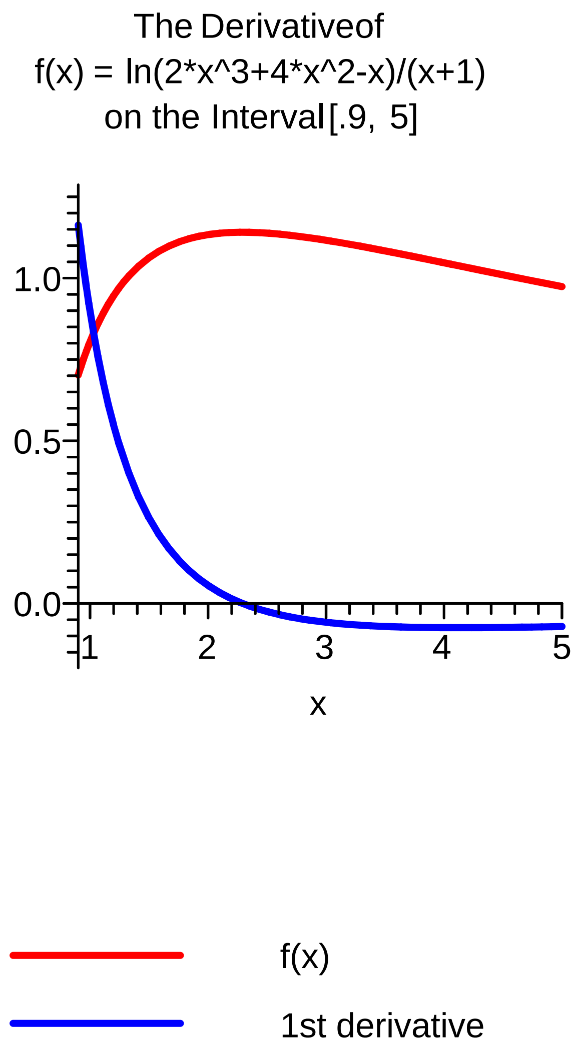
$f2 := diff(f, x\$\, 2);$

$$\frac{12x + 8}{\left(2x^3 + 4x^2 - x\right)(x+1)} - \frac{\left(6x^2 + 8x - 1\right)^2}{\left(2x^3 + 4x^2 - x\right)^2 (x+1)} - \frac{2\left(6x^2 + 8x - 1\right)}{\left(2x^3 + 4x^2 - x\right)(x+1)^2} + \frac{2\ln\left(2x^3 + 4x^2 - x\right)}{(x+1)^3} \quad (3)$$

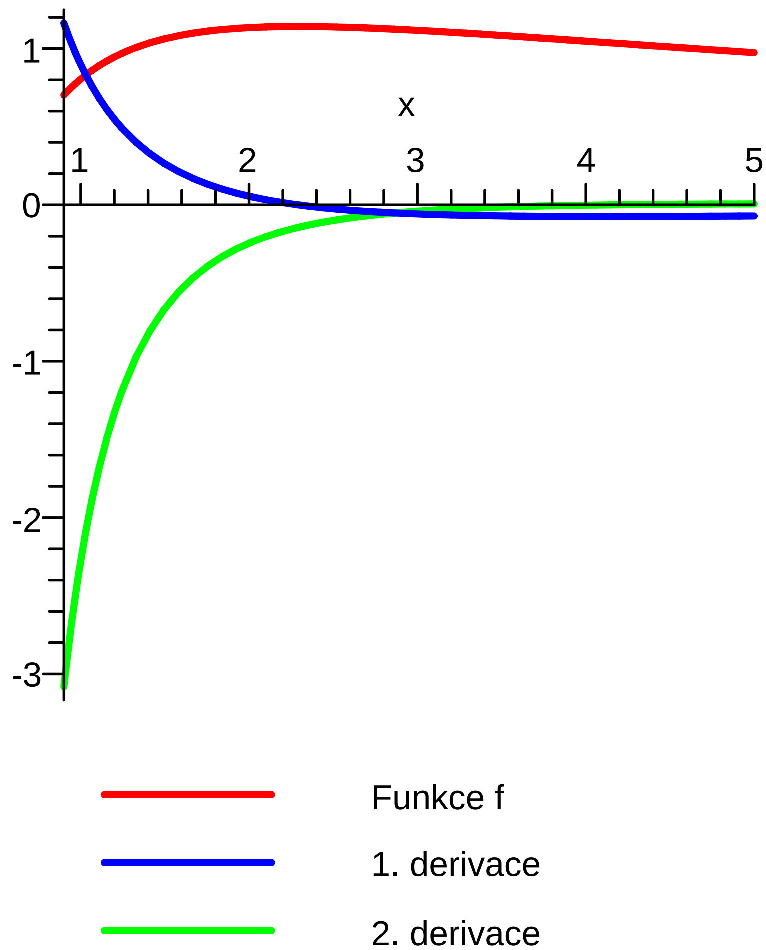
$plot(f, x = 0 ..5, thickness = 2);$



$DerivativePlot(f, x = 0.9 .. 5, thickness = 2);$



plot([*f*, *f1*, *f2*], *x* = 0.9 ..5, *thickness* = 2, *color* = [*red*, *blue*, *green*], *legend* = ["Funkce f","1. derivace","2. derivace"]);



$f[1] := eval(f, x = 1);$

$$\frac{1}{2}\ln(5) \qquad (1)$$

$f1[1] := eval(f1, x = 1);$

$$\frac{13}{10} - \frac{1}{4}\ln(5) \qquad (2)$$

$f2[1] := eval(f2, x = 1);$

$$-\frac{67}{25} + \frac{1}{4}\ln(5) \qquad (3)$$

$evalf(f[1]);$

$$0.8047189560 \qquad (4)$$

$evalf(f1[1]);$

$$0.8976405220 \qquad (5)$$

$evalf(f2[1]);$

$$-2.277640522 \qquad (6)$$

$showtangent(f, x = 1, x = 0.5 ..5, color = [cyan, red], thickness = 2);$