

Derivatives and applications

I - Formal calculations : *(show all in the blank spaces below)*

1. Find a simple formula for the derivative function of $f : x \mapsto \frac{ax+b}{cx+d}$

2. Let $f : x \mapsto \frac{1}{\sqrt{x}}$

a) Find the growth rate of f at $x=1$, and compute its limit in 1.

b) Compute $\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ ($x > 0$) and then give the formula of the derivative of the above function.

II . Use the general formulas of the derivatives to compute the derivative of the following functions, study their domain of existence, their sign and determine the variations on each interval (chart).

$$f_1(x) = \frac{x^2 + 4x + 5}{x^2 - 2x - 3}$$

x	$-\infty$	$+\infty$
$Sign [f_1'(x)]$		
Variations of f_1		

$$f_2(x) = \sqrt{x^2 - 2x - 3}$$

x	$-\infty$	$+\infty$
$Sign [f_2'(x)]$		
Variations of f_2		