

Answer on Question #48614 – Math – Calculus

Question.

$d/dx \tan^{-1}(ax-b/a+bx)$ w.r.t x

Solution.

$$\begin{aligned} \frac{d}{dx} \left(\tan^{-1} \left(\frac{ax-b}{a+bx} \right) \right) &= \frac{\frac{a(a+bx) - b(ax-b)}{(a+bx)^2}}{1 + \left(\frac{ax-b}{a+bx} \right)^2} = \frac{a^2 + abx - abx + b^2}{a^2 + 2abx + b^2x^2 + a^2x^2 - 2abx + b^2} = \\ &= \frac{a^2 + b^2}{(a^2 + b^2)(x^2 + 1)} = \frac{1}{x^2 + 1} \end{aligned}$$

Answer.

$$\frac{1}{x^2 + 1}$$