

Homework (analysis): set 3.

1. Using the definition of the derivative find the derivative of $f(x) = \frac{2x+1}{3x+1}$ at $x = 1$.
2. Find the derivative of $g(x) = \ln(\arctan(\frac{x}{2}))$.
3. Find all points on the graph of $y = 3 + 2 \sin x$ where the tangent line to the curve is parallel to the line $y = \sqrt{2}x - 5$. Find the equation of one of these tangent lines.
4. Find the second derivative: $y = \frac{x^2-2x+3}{x^2+2x-3}$.
5. Find slope of the tangent line to the curve $x^3y^5 + 3x = 8y^3 - 4$ at the point $(1, 1)$. (Use implicit differentiation.) Write the equation of this line.

Please write the solutions clearly (by hand) on A4 paper and give it to me on (or before) 28/11/2018.