

Discussion Problems

Name: _____

Worksheet 4: Domain, Range, and Tangent Lines

Math 408C:

Instructor: Athil George

Problem 1. Find the domain of $\ln(x - 3)$. What about the range?

Problem 2. Find the equation of the tangent line of the function $f(x) = \sqrt{x+3}$ at $x=3$

Problem 3. Given that the $\lim_{x \rightarrow 1} [(1 + \frac{1}{x})^{1/x}] = e$, find the derivative of $f(x) = \ln(x)$.

Problem 4. Find the $\lim_{x \rightarrow -\infty} \frac{|x-3| + \sqrt{x^2+4}}{|6-x||5-x|}$.

Problem 5. Show that any polynomial function in the form $f(x) = \phi x^2 + \theta x + \psi$ has tangent line that is has slope $2a\phi + \theta$ at any point $x=a$. Note that ϕ, θ, ψ are real numbers and not variables.