Name:

Please show your work and give justifications for your answers. You may use a calculator on the quiz; you may not use your cell phone. Try not to spend too much time on any one problem. If you get stuck on a problem, leave a partial answer and move on to the next problem.

(1) (25 pts) Find the derivative: $f(x) = (3x^2 + 2)^4$

(2) (25 pts) If $F(x) = x^4 + 12$ and $f(x) = x^3$, is $F(x)$ an antiderivative of $f(x)$? Why or why not?

(3) (25 pts) Simplify: $\dfrac{1}{x+1} + \dfrac{x+1}{x^2+x}$

(4) (25 pts) Consider the function $f(x) = x^2 + 2$. What is the slope of the tangent line to the graph of $f(x)$ at the point $(2, 6)$? In other words, what is the rate of change of $f(x)$ when $x = 2$?