Math 252: Quiz 1 **Spring 2026**

Name: _____ | _____ / 24

24 points possible; each part is worth 2 points. No aids (book, notes, calculator, phone, etc.) are permitted. Show all work and use proper notation for full credit.

1. [12 points] Compute the derivatives of the following functions.

a. $f(x) = x^2 e^{x^2+1} + x + 1$

b. $f(x) = \tan(2x) + \sin^2(x)\cos(x)$

c. $f(x) = \dfrac{3x^2 - 1}{\ln(x^2+1)}$

d. $f(x) = \sqrt{x + \sin^2(x^2)}$

e. $f(x) = e^{1/x} - \dfrac{x^2}{2} + \dfrac{2}{\sqrt{x}}$

f. $f(x) = \ln(a + b^{2x})$ where a and b are constants

2. [12 points] Compute the following antiderivatives (indefinite integrals) and definite integrals. Remember that antiderivatives need a "$+C$".

a. $\displaystyle\int_0^{\pi} 4e^x + \cos(x)\, dx$

b. $\displaystyle\int_0^{3} (x+2)(x-3)\, dx$

c. $\displaystyle\int 2x^3\sqrt{x^2+1}\, dx$

d. $\displaystyle\int_0^{\pi/3} \sec^2(x)\tan(x)\,dx$

e. $\displaystyle\int \frac{e^x}{1+e^{(2x)}}\,dx$

f. $\displaystyle\int \tan(2x)\,dx$