Math 252: Quiz 1 **Spring 2024**

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. Answers should be in reasonably-simplified form.

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

a. $f(\theta) = \theta\cos(\theta) + \dfrac{\pi}{2}$

b. $f(x) = 5e^{x/2} + \sin^2(x)$

c. $h(x) = \sqrt{ax^2 + b^2}$ where a and b are constants

d. $f(x) = \ln(\tan(2x) + \sec(2x))$

e. $h(x) = \left(x + \sin(x^2+1)\right)^{-2}$

f. $h(x) = \dfrac{1}{5x} + \arctan(x^3)$

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

a. $\displaystyle\int_{-1}^{1} x(2-x)\,dx$

b. $\displaystyle\int \sin(\pi x) + \frac{2}{3x}\,dx$

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

d. $\displaystyle\int_0^{\pi/2} \cos(x)(\sin(x)+1)^3\,dx$

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

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