

Math 212 RS2 Quiz 4A

February 18, 2020

Name: _____

Instructions: No calculators. Use your own scrap paper and write your answers in the space provided.

1. Suppose $\int_a^b f(x) dx$ is an integral in which $f(x)$ is a rational expression of trig functions.

(a) State the traditional Weierstrass substitution: $u =$ _____

(b) Using this substitution, derive or state $dx =$ _____ in terms of du

(c) Using this substitution, derive or state $\sin x =$ _____ as a function of u

(d) Using this substitution, derive or state $\cos x =$ _____ as a function of u

(e) Compute: $\int \frac{1}{\sin x + \cos x + 1} dx =$ _____

2. Integrate the following:

(a) $\int \frac{x}{(1-2x)^3} dx =$ _____ (b) $\int \frac{x^2 + 5x + 3}{x^2 + x + 1} dx =$ _____

(c) $\int \frac{2}{x^2 - x - 2} dx =$ _____

Bonus:

1. In approximating the integral $\int_a^b f(x) dx$ with n subintervals, define what Δx is.

$\Delta x =$ _____

2. Name three numerical integration rules used to approximate definite integrals:
