Math 212 RS2 Quiz 4B

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 $\sin x =$ _____ as a function of u

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

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

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

2. Integrate the following:

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

(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:

_____

_____