

Math 212 RS2 Quiz 3B

February 11, 2020

Name: _____

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

1. Complete the following rules:

(a) $\int \sec^3 x \, dx =$ _____ (b) $\int \sec x \, dx =$ _____

(c) $\int \frac{1}{\sqrt{1-x^2}} \, dx =$ _____ (d) $\int \ln x \, dx =$ _____

(e) $\int \frac{1}{1+x^2} \, dx =$ _____ (f) $\int \tan x \, dx =$ _____

2. Complete the following table of trig substitutions (the first row is an example):

Expression	Substitution	Identity
$a^2 + x^2$	$x = a \tan \theta$	$1 + \tan^2 \theta = \sec^2 \theta$
$x^2 - a^2$		
	$x = a \sin \theta$	

3. Integrate the following:

(a) $\int \sin^3 x \cos^4 x \, dx =$ _____ (b) $\int \cos^2 x \, dx =$ _____

(c) $\int \tan^3 \theta \sec^4 \theta \, d\theta =$ _____ (d) $\int \frac{x^2}{\sqrt{1-x^2}} \, dx =$ _____

(e) $\int x^2 \sin x \, dx =$ _____ (f) $\int \frac{\sin 2x}{1 + \cos^4 x} \, dx =$ _____

Bonus:

1. $\int \frac{x^2 - 1}{x^2 + 1} \, dx =$ _____ (b) $\int \frac{1}{x^2 + x - 6} \, dx =$ _____

2. Write down the partial fractions decomposition of $\frac{12}{x^2(x^2+9)^2(x^2-1)}$. You may use A, B, C, \dots for the arbitrary constants. You need not find the values of the arbitrary constants.
