

Math 212 GH Quiz 3A

February 10, 2020

Name: _____

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

1. Complete the following rules:

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

(c) $\int \tan x \, dx =$ _____ (d) $\int \sec^3 x \, dx =$ _____

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

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

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

3. Integrate the following:

(a) $\int \sin^5 x \cos^3 x \, dx =$ _____ (b) $\int \sin^2 x \, dx =$ _____

(c) $\int \sec^2 \theta \ln \tan \theta \, d\theta =$ _____ (d) $\int \frac{x^2}{\sqrt{x^2+9}} \, dx =$ _____

(e) $\int t^2 \cos t \, dt =$ _____ (f) $\int \arcsin x \, dx =$ _____

Bonus:

1. $\int \frac{x^2 - 4}{x^2 + 1} \, dx =$ _____ (b) $\int \frac{1}{x^2 + 5x + 6} \, dx =$ _____

2. Write down the partial fractions decomposition of $\frac{12}{x^2(x^2+4)^2(x^2-1)}$. You may use A, B, C, \dots for the arbitrary constants. You need not find the values of the arbitrary constants.
