Math 212 GH Quiz 3B

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:

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

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

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

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

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

3. Integrate the following:

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

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

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

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

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