

Math 212 RS2 Quiz 2B

February 4, 2020

10 + Bonus points possible

Name: ANSWERS

Instructions: Use your own scrap paper and write your answers in the space provided.

1. State the Integration by Parts Formula: $\int u dv = uv - \int v du$

2. What mnemonic tells you how to choose u in the above formula? LIATE OR LIPET

3. Complete the following rules:

(a) $\int \frac{1}{x} dx = \ln|x| + C$ (b) $\int \frac{1}{\sqrt{1+x^2}} dx = \sinh^{-1} x + C$

(c) $\int \ln x dx = x \ln x - x + C$ (d) $\int \sinh x dx = \cosh x + C$

4. Integrate the following:

(a) $\int_0^{\sqrt{\pi}} x^3 \cos x^2 dx = -1$ (b) $\int \frac{x^3}{\sqrt{16-x^2}} dx = \frac{(16-x^2)^{3/2}}{3} - 16\sqrt{16-x^2} + C$

(c) $\int x^2 e^{3x} dx = e^{3x} \left(\frac{x^2}{3} - \frac{2x}{9} + \frac{2}{27} \right) + C$ (d) $\int \frac{e^{-2x}}{e^{-4x} - 1} dx = \frac{1}{2} \tanh^{-1}(e^{2x}) + C$
 $\frac{1}{2} \tanh^{-1}(e^{-2x}) + C$

Bonus:

1. Complete the following rules:

(a) $\frac{d}{dx} \log_a x = \frac{1}{x \ln a}$ (b) $\int \tan x dx = \ln|\sec x| + C$ OR $-\ln|\cos x| + C$

(c) $\int \sec x dx = \ln|\sec x + \tan x| + C$ (d) $\int \sec^3 x dx = \frac{1}{2}(\sec x \tan x + \ln|\sec x + \tan x|) + C$

(e) $\int \frac{1}{\sqrt{x^2-1}} dx = \cosh^{-1} x + C$