Name: Richard

MATH 200 – QUIZ 12 $

Instructions: Show work and put a box around your final answer.

April 11, 2013

1. $\lim_{x\to 0} \frac{e^{\sin x} - 1}{x} =$ $\lim_{x\to 0} \frac{e^{\sin(x)}\cos(x)}{1} = e^{\sin(0)}\cos(0) = e^0 \cdot 1 = \boxed{1}$

form $\frac{0}{0}$ — L'Hôpital's Rule

2. $\int \left(4x + \frac{1}{x} + \sin(x)\right) dx =$ $4\frac{1}{2}x^2 + \ln|x| - \cos(x) + C = \boxed{2x^2 + \ln|x| - \cos(x) + C}$

3. $\int e^{3x}\, dx =$ $\boxed{\frac{1}{3}e^{3x} + C}$

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1. $\lim_{x\to \frac{\pi}{2}} \frac{\cos(x)}{\sin(2x)} =$ $\lim_{x\to \frac{\pi}{2}} \frac{-\sin(x)}{2\cos(2x)} = \frac{-\sin(\pi/2)}{2\cos(2\cdot\pi/2)} = \frac{-\sin(\pi/2)}{2\cos(\pi)} = \frac{-1}{2\cdot(-1)} = \boxed{\frac{1}{2}}$

form $\frac{0}{0}$ — L'Hôpital's Rule

2. $\int (e^x + e + \sec^2(x))\, dx =$ $\boxed{e^x + ex + \tan(x) + C}$

3. $\int \frac{2}{|x|\sqrt{x^2-1}}\, dx =$ $2\int \frac{1}{|x|\sqrt{x^2-1}}\, dx$ $\boxed{2\sec^{-1}(x) + C}$

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1. $\lim_{x\to 0} \frac{3x}{1-e^{\sin x}} =$ $\lim_{x\to 0} \frac{3}{0-e^{\sin(x)}\cos(x)} = \frac{3}{-e^{0}\cos(0)} = \frac{3}{-1\cdot 1} =$ $\boxed{-3}$

form $\frac{0}{0}$ — L'Hôpital's Rule

2. $\int (2e^x + x^4 + \sec(x)\tan(x))\,dx =$ $\boxed{2e^x + \frac{1}{5}x^5 + \sec(x) + C}$

3. $\int \frac{5}{\sqrt{1-x^2}}\,dx =$ $5\int \frac{1}{\sqrt{1-x^2}}\,dx =$ $\boxed{5\sin^{-1}(x) + C}$

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1. $\lim_{x\to \frac{\pi}{2}} \frac{2x-\pi}{\cos(2\pi - x)} =$ $\lim_{x\to \frac{\pi}{2}} \frac{2-0}{-\sin(2\pi - x)(-1)} = \frac{2}{-\sin\left(\frac{3\pi}{2}\right)(-1)} = \frac{2}{\sin\left(\frac{3\pi}{2}\right)} = \frac{2}{-1} =$ $\boxed{-2}$

form $\frac{0}{0}$ — L'Hôpital's Rule

2. $\int (\sqrt[3]{x} + \cos(x))\,dx =$ $\int \left(x^{\frac{1}{3}} + \cos(x)\right)dx = \frac{1}{\frac{1}{3}+1}x^{\frac{1}{3}+1} + \sin(x) + C$

$= \frac{1}{\frac{4}{3}}x^{4/3} + \sin(x) + C = \frac{3}{4}x^{\frac{4}{3}} + \sin(x) + C$

$= \boxed{\frac{3}{4}\sqrt[3]{x^4} + \sin(x) + C}$

3. $\int \frac{2}{1+x^2}\,dx =$ $2\int \frac{1}{1+x^2}\,dx =$

$\boxed{2\tan^{-1}(x) + C}$