LAST NAME: FIRST NAME: KEY

Math 65B - Summer 2016

Quiz 6: Thursday June 23, 2016

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1. (1 point) Compute the following integral:

$$\int_{1}^{\cos(x)} \sin(\ln(x))\, dx$$

Integration by parts

$u = \ln(\sin(x))$ $\quad dv = \cos(x)\,dx$

$du = \frac{\cos(x)}{\sin(x)}\,dx$ $\quad v = \sin(x)\,dx$

$$\int u\,dv = uv - \int v\,du$$

$$\Rightarrow \int \cos(x)\ln(\sin(x))\,dx = \ln(\sin(x))\sin(x) - \int \sin(x)\cdot\frac{\cos(x)}{\sin(x)}\,dx$$

$$= \sin(x)\ln(\sin(x)) - \sin(x) + C$$

$$= \boxed{\sin(x)\left[\ln(\sin(x)) - 1\right] + C}$$

Please, show all work.

2. (1 point) Compute the following integral:

$$\int \sec^3(x)\,dx = \int \sec(x)\sec^2(x)\,dx$$

$u = \sec(x)$ $\quad dv = \sec^2(x)\,dx$

$du = \sec(x)\tan(x)$ $\quad v = \tan(x)$

$$\Rightarrow \int \sec^3(x)\,dx = \sec(x)\tan(x) - \int (\sec(x)\tan^2(x))\,dx$$

$$= \sec(x)\tan(x) - \int \sec(x)(-1+\sec^2(x))\,dx$$

$$= \sec(x)\tan(x) - \int \sec^3(x)\,dx + \int \sec(x)\,dx$$

$$= \sec(x)\tan(x) - \int \sec^3(x)\,dx + \ln|\sec(x)+\tan(x)| + C$$

$$\Rightarrow 2\int \sec^3(x)\,dx = \sec(x)\tan(x) + \ln|\sec(x)+\tan(x)| + C$$

$$\Rightarrow \int \sec^3(x)\,dx = \frac{1}{2}\left[\sec(x)\tan(x) + \ln|\sec(x)+\tan(x)|\right] + C$$

Please, show all work.