LAST NAME: FIRST NAME: KEY

Math 65B - Summer 2016

Quiz 5: Tuesday June 21, 2016

1. (1 point) Compute the following integral:

$$\int \frac{x+3}{x^2+9}\,dx$$

$$\int \frac{x+3}{x^2+9}\,dx = \int \frac{x}{x^2+9}\,dx + \int \frac{3}{x^2+9}\,dx$$

$u = x^2+9$

$du = 2x\,dx$

$\Rightarrow x\,dx = \frac{du}{2}$

$$= \frac{1}{2}\int \frac{1}{u}\,du + 3\int \frac{1}{x^2+3^2}\,dx \qquad w^2 = x^2,\ a^2 = 3^2$$

$$= \frac{1}{2}\ln|u| + 3\cdot\frac{1}{3}\tan^{-1}\left(\frac{x}{3}\right) + C$$

$$= \boxed{\frac{1}{2}\ln(x^2+9) + \tan^{-1}\left(\frac{x}{3}\right) + C}$$

Please, show all work.

2. (1 point) Compute the following integral:

$$\int \frac{\cos(x)}{1+\sin^2(x)}\,dx$$

$\int \frac{\cos(x)}{1+\sin^2(x)}\,dx$ Let $u = \sin x$, $du = \cos x\,dx$

$= \int \frac{1}{1+u^2}\,du$

$= \tan^{-1}(u) + C$

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

Please, show all work.