Name: Richard

QUIZ 8

MATH 201
February 18, 2025

1. $\int_0^{\pi/4} \tan(x)\,dx =$ $\left[\ln|\sec(x)|\right]_0^{\pi/4}$

$= \ln\left|\sec\left(\frac{\pi}{4}\right)\right| - \ln|\sec(0)|$

$= \ln\left|\frac{2}{\sqrt{2}}\right| - \ln|1|$

$= \boxed{\ln|\sqrt{2}|}$

2. $\int \frac{x^2+6x+9}{x+1}\,dx =$ $\int x+5-\frac{1}{x+1}\,dx$ $= \boxed{\frac{x^2}{2}+5x-4\ln|x+1|+C}$

$$
\begin{array}{r}
x+5 \\
x+1 \overline{)\,x^2+6x+9} \\
\underline{x^2+x} \\
5x+9 \\
\underline{5x+5} \\
4
\end{array}
$$

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1. $\int_0^{\pi/4} \sec(x)\,dx =$ $\left[\ln|\sec(x)+\tan(x)|\right]_0^{\pi/4}$

$= \ln|\sec(\pi/4)+\tan(\pi/4)| - \ln|\sec(0)+\tan(0)|$

$= \ln\left|\frac{2}{\sqrt{2}}+1\right| - \ln|1+0|$

$= \ln\left|\frac{2}{\sqrt{2}}+1\right|$

$= \ln\left|\frac{2+\sqrt{2}}{\sqrt{2}}\right|$

$= \ln\left|\frac{2\sqrt{2}+2}{2}\right|$

$= \boxed{\ln|\sqrt{2}+1|}$

2. $\int \frac{1}{x^2+6x+10}\,dx =$ $\int \frac{1}{x^2+6x+9-9+10} = \int \frac{dx}{(x+3)^2+1}$ $\begin{cases} u = x+3 \\ du = dx \end{cases}$

$= \int \frac{du}{u^2+1} = \tan^{-1}(u) + C$

$= \boxed{\tan^{-1}(x+3) + C}$