Math 172 — 26 Feb 2016

Quiz 5 — Show Appropriate Work

Name: ____________________

Point Values in $\boxed{\text{boxes}}$.

You may find the following useful.

$$\int \frac{du}{u^2+a^2} = \frac{1}{a}\arctan\left(\frac{u}{a}\right) + C$$

Integrate.

1. $\boxed{3}$ $\displaystyle\int \frac{1-x}{x^2+x}\,dx = \int \left(\frac{1}{x} - \frac{2}{x+1}\right)dx = \ln|x| - 2\ln|x+1| + C$

$$\frac{1-x}{x(x+1)} = \frac{A}{x} + \frac{B}{x+1}$$

$1 - x = A(x+1) + Bx$

Let $x=0$, $1 = A$

Let $x=-1$, $2 = -B$

2. $\boxed{3}$ $\displaystyle\int \frac{2x}{x^2+2x+5}\,dx = \int\left(\frac{2x+2}{x^2+2x+5} - \frac{2}{(x+1)^2+2^2}\right)dx$

$$= \ln(x^2+2x+5) - \arctan\left(\frac{x+1}{2}\right) + C$$

3. $\boxed{4}$ $\displaystyle\int \frac{9-x}{x(x^2+9)}\,dx = \int\left(\frac{1}{x} - \frac{x}{x^2+9} - \frac{1}{x^2+9}\right)dx = \ln|x| - \frac{1}{2}\ln(x^2+9) - \frac{1}{3}\arctan\left(\frac{x}{3}\right) + C$

$$\frac{9-x}{x(x^2+9)} = \frac{A}{x} + \frac{Bx+C}{x^2+9}$$

$9 - x = A(x^2+9) + (Bx+C)x$

Let $x=0$: $9 = A(9) \Rightarrow A=1$

Eq. Coef.: $\underline{x^2}$: $0 = A+B \Rightarrow B=-1$

$\underline{x}$: $-1 = C$