

Name: _____

Section: _____

MA 114 QUIZ #6

October 16, 2014

The following quiz is worth 4 points. Each problem will be worth 2 points. Be sure to read the problem carefully and answer every part of the problem. Be sure to show all of your work. Answers without support will not receive any credit.

1. Use integration by parts to calculate the antiderivative $\int x \ln(x) dx$.

Choose $u = \ln(x)$ and $dv = x$ so $du = 1/x$ and $v = x^2/2$

$$\begin{aligned}\int x \ln(x) dx &= \frac{x^2 \ln(x)}{2} - \int \frac{x}{2} dx \\ &= \frac{x^2 \ln(x)}{2} - \frac{x^2}{4} + C\end{aligned}$$

1 point for correct choice of u and dv and 1 point for correctly plugging into $\int u dv = uv - \int v du$.

2. Calculate $\int_0^\pi \cos^3(x) dx$

Substitute $\cos^2(x) = 1 - \sin^2(x)$ and then use the u -substitution $u = \sin(x)$

$$\int_0^\pi \cos^3(x) dx = \int_0^\pi (1 - \sin^2(x)) \cos(x) dx = \int_{\sin(0)}^{\sin(\pi)} (1 - u^2) du$$

And from here you might notice that the limits of integration are the same, or you might actually do it out:

$$= u - \frac{u^3}{3} \Big|_{\sin(0)}^{\sin(\pi)} = \left(\sin(\pi) - \frac{\sin^3(\pi)}{3} \right) - \left(\sin(0) - \frac{\sin^3(0)}{3} \right) = 0$$

1 point for trig identity and u -sub, 1 point for integration/answer.