**Assessment Quiz**

**MATH 172 Lab: Section 7**

**Lab Instructor (TA): Mohammed Kaabar**

Student's Name:-------------SOLUTION------------------

Student's ID:--------------------------

***Note:*** *I will grade this as a regular quiz. However, everyone who completes the quiz will get 5 points extra credit for participation.*

**Show your work and circle your answers. Neatness and organization count!**

**Question 1:** (1 point) Suppose $w$ is a continuous function on the interval $[k_1, k_2]$. Consider $\int_{k_1}^{k_2} w(x)\, dx$. What property must $w$ have in order that the integral be interpreted as the area bounded by the graph of $w$ and the $x$-axis, between $x = k_1$ and $x = k_2$?

A function $w$ must be integrable function on $[k_1, k_2]$. This means the following:

$\lim_{n\to\infty} R_n = \lim_{n\to\infty} \{\sum_{i=1}^{n} w(x_i)\Delta x\}$ exists and is unique over all partitions of $[k_1, k_2]$, and all choices of $x_i$ on a partition. (Note: Any other related answers are correct)

**Question 2:** (2 points) Evaluate $\int_0^3 (4 + 2t)\, dt$.

$$\int_0^3 (4 + 2t)\, dt = 4t + t^2 \Big|_0^3 = (4(3) + (3)^2) - (4(0) + (0)^2) = 21$$

**Question 3:** (2 points) Evaluate $\int \alpha(\alpha^2 - 2)^5 d\alpha$.

We use integration by substitution as follows:

Let $u = \alpha^2 - 2$, then $du = 2\alpha d\alpha \rightarrow$ Therefore, $\alpha d\alpha = \frac{du}{2}$

Now, our integral becomes as follows:

$$\int \alpha(\alpha^2 - 2)^5 d\alpha = \int u^5 \frac{du}{2} = \frac{1}{2}\int u^5\, du = \frac{1}{2}\left(\frac{u^6}{6}\right) = \frac{u^6}{12} + c = \frac{1}{12}(\alpha^2 - 2)^6 + c$$