Quiz #2

Directions: Carefully read each question below and answer to the best of your ability in the space provided. Your answer to problem # 2 should be written in a clear and concise manner.
You **MUST** show your work to receive full credit!

1. (5 points) Evaluate the following indefinite integral

$$\int \left(x^3 (x^4 + 1)^{\frac{3}{4}} \right) dx$$

Solution: Let $u = x^4 + 1$, then $\frac{du}{dx} = 4x^3$ or $\frac{1}{4} du = x^3 dx$, then

$$\int \left(x^3 (x^4 + 1)^{\frac{3}{4}} \right) dx = \int \frac{1}{4} u^{\frac{3}{4}} dx = \frac{1}{4} \frac{u^{\frac{7}{4}}}{\frac{7}{4}} + C = \frac{1}{7} u^{\frac{7}{4}} + C = \boxed{\frac{1}{7} (x^4 + 1)^{\frac{7}{4}} + C}$$

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2. (5 points) Find $\int x^5 \ln(x) \, dx$ using integration by parts.

Solution: Set

$$
\begin{aligned}
u &= \ln(x) & dv &= x^5 \, dx \\
du &= \frac{1}{x} \, dx & v &= \frac{x^6}{6}
\end{aligned}
$$

Then

$$
\begin{aligned}
\int x^5 \ln(x) \, dx &= uv - \int v \, du \\
&= \ln(x) \frac{x^6}{6} - \int \frac{x^6}{6} \cdot \frac{1}{x} \\
&= \ln(x) \frac{x^6}{6} - \frac{1}{6} \int x^5 \, dx \\
&= \ln(x) \frac{x^6}{6} - \frac{1}{6} \cdot \frac{x^6}{6} + C \\
&= \boxed{\ln(x) \frac{x^6}{6} - \frac{x^6}{36} + C}
\end{aligned}
$$

Name: _____

Section (circle one):   001   002

Question:	1	2	Total
Points:	5	5	10
Score:			