

Quiz 2

Name: _____

Answer all questions in a clear and concise manner. Unsupported answers will receive *no credit*.

1. Find the form of the partial fractions decomposition of

$$\frac{8x^2 + 4}{x^4 - 1}$$

You **do not** need to solve for the coefficients. Hint: $x^4 - 1$ is a difference of squares $(x^2 - 1)(x^2 + 1)$.

$$\frac{8x^2 + 4}{x^4 - 1} = \frac{8x^2 + 4}{(x+1)(x-1)(x^2+1)} = \boxed{\frac{A}{x+1} + \frac{B}{x-1} + \frac{Cx+D}{x^2+1}}$$

2. Find the area under the graph of xe^{3x} between 0 and 1.

$$A = \int_0^1 xe^{3x} dx = \frac{1}{3} xe^{3x} \Big|_0^1 - \int_0^1 \frac{1}{3} e^{3x} dx$$

$$= \frac{1}{3} xe^{3x} - \frac{1}{9} e^{3x} \Big|_0^1$$

$$= \left(\frac{1}{3} e^3 - \frac{1}{9} e^3 \right) - \left(0 - \frac{1}{9} e^0 \right)$$

$$= \boxed{\frac{1}{6} e^3 + \frac{1}{9}}$$

$$\begin{aligned} u &= x & dv &= e^{3x} dx \\ du &= dx & v &= \frac{1}{3} e^{3x} \end{aligned}$$