MATH 2202 – Quiz 1 (Version 1) Solution
January 16, 2008

NAME_______________________________________

1. Use a substitution to evaluate the indefinite integral

\[ \int x (4 + x^2)^{10} \, dx. \]

2. Use differentiation to check whether or not the answer you obtained in part 1 is correct. Have you found that your answer is correct or incorrect?

You must show your procedures in order to receive any credit. You will not receive credit if you just write down an answer without showing how that answer was obtained.

Solution

1. To evaluate this indefinite integral, we use the substitution

\[ u = 4 + x^2 \]

\[ du = 2x \, dx. \]

We then evaluate the integral as follows:

\[ \int x (4 + x^2)^{10} \, dx = \frac{1}{2} \int u^{10} \, du = \frac{1}{22} u^{11} + C = \frac{1}{22} (4 + x^2)^{11} + C. \]

2. Show the check of your answer here. Do you find that your answer is correct or incorrect? (Please answer this in a complete sentence.)

\[ \frac{d}{dx} \left( \frac{1}{22} (4 + x^2)^{11} \right) = \frac{1}{22} \cdot 11 (4 + x^2)^{10} \cdot 2x = x (4 + x^2)^{10} \]

shows that our answer is correct.