1. Finding \( \int x^5 \sin(4x) \, dx \) requires using the integration-by-parts technique over and over. Show the result after just the \textit{first} application of integration-by-parts — your answer will contain a new integral and you will stop there. Show all your work, especially your choices for \( u \), etc.

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BONUS: \text{To find } \int x^5 \sin(4x) \, dx, \text{ what is the } \mathit{total} \text{ number of times you need to “do” integration-by-parts?}
\]

2. As you know, the partial fraction decomposition of \( \frac{4x - 5}{(x - 3)^2} \) has the form \( \frac{A}{x - 3} + \frac{B}{(x - 3)^2} \). Find \( A \) and \( B \) (show all your work) and use the results to find \( \int \frac{4x - 5}{(x - 3)^2} \, dx \).