

STEP III, 2020, Q7 EC

This was the second most popular question, but the most successful with a mean score of nearly two thirds marks. All but the weakest candidates managed to do part (i) perfectly well. Similarly, finding the first order differential equation for $g(x)$ in part (ii) caused very few problems. Most candidates that attempted to substitute the given expression for $g(x)$ in the first order differential equation obtained the correct polynomial equation, and a few gave up having done this. Most guessed the value $n = -1$ and then found that $k = 2$ works, whilst some just wrote the values of k and n , without any explanation. It wasn't uncommon for candidates to get stuck finding k or n , usually due to arithmetic errors. Most candidates attempting to find $u(x)$ were able to find the integrating factor and perform the integration, although a significant proportion got the integral wrong. Regardless of accuracy, everyone attempted inserting the initial conditions. Some candidates also tried using a particular and complimentary solution method to integrate, but only a few who attempted that got the complimentary part correct. If candidates solved for $u(x)$ correctly, they usually did so for y as well.



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