

## STEP II, 2022, Q2 EC

### Question 2

Many candidates who attempted this question struggled to achieve high marks as there were several points within this question where the reasoning required careful explanation.

Part (i) was often completed successfully by candidates who recognised that the relationship given could easily be rearranged to show the required result. Approaches which did not recognise this and tried to use the relationship expressed for different triples of terms were unable to make any significant progress. Candidates who attempted to argue that higher powers would not lead to a common difference were generally not successful in showing that the sequence has degree at most one.

The first section of part (ii) was generally well done by those who attempted it, and the relationship with the first part was often seen although in some cases candidates omitted to observe that  $p$  was not equal to zero. Candidates were also often able to deduce the formula for the sequence, either by substituting a general form or by looking at the differences between terms.

Many of the candidates who attempted part (iii) recognised that a similar approach to part (ii) would be likely to work. However, many assumed that the required coefficient of  $n^3$  would be  $a$ , rather than using a variable so that the correct coefficient could be deduced at a later point. The algebra for this part was more complicated and some struggled to follow through the work accurately. Having reached the point where the correct value of  $k$  could be deduced it was then necessary to consider when the new sequence would be of the form in part (ii) and when it would be of the form in part (i) and the analysis of these cases was not always completed fully.



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