Continuation of working space for Question 10.

11 The number of permutations of n items taken 4 at a time is equal to $\frac{1}{6}\times$ the number of permutations of $2n$ items taken 3 at a time.

(a) Show that n satisfies the equation $3n^2 - 19n + 20 = 0$. [4]

(b) Hence find the value of n. [2]

Question 12 is printed on the next page.

DO NOT WRITE IN THIS MARGIN DO NOT WRITE IN THIS MARGIN DO NOT WRITE IN THIS MARGIN DO NOT WRITE IN THIS MARGIN DO NOT WRITE IN THIS MARGIN

12 Solutions to this question by accurate drawing will not be accepted.

Relative to an origin O, the position vectors of the points A, B and C are $\overrightarrow{OA} = \begin{pmatrix} 1 \\ 7 \end{pmatrix}$, $\overrightarrow{OB} = \begin{pmatrix} 7 \\ 4 \end{pmatrix}$ and $\overrightarrow{OC} = k\begin{pmatrix} 1 \\ 2 \end{pmatrix}$, where k is a scalar constant.

Given that C lies on the line AB, use a vector method to find the ratio $AC : AB$. [6]

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

Cambridge Assessment International Education is part of Cambridge Assessment. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which is a department of the University of Cambridge.