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[2]

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(c) Use an iterative formula based on the equation in part (a) to determine  $p$  correct to 2 decimal places. Give the result of each iteration to 4 decimal places.

[3]

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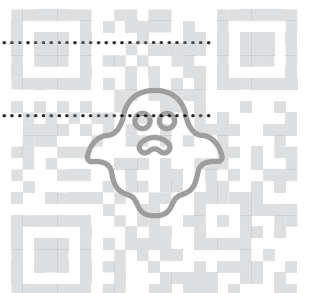
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9 With respect to the origin  $O$ , the position vectors of the points  $A$ ,  $B$  and  $C$  are given by

$$\vec{OA} = \begin{pmatrix} 0 \\ 5 \\ 2 \end{pmatrix}, \quad \vec{OB} = \begin{pmatrix} 1 \\ 0 \\ 1 \end{pmatrix} \quad \text{and} \quad \vec{OC} = \begin{pmatrix} 4 \\ -3 \\ -2 \end{pmatrix}.$$

The midpoint of  $AC$  is  $M$  and the point  $N$  lies on  $BC$ , between  $B$  and  $C$ , and is such that  $BN = 2NC$ .

(a) Find the position vectors of  $M$  and  $N$ . [3]

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(b) Find a vector equation for the line through  $M$  and  $N$ . [2]

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