

### Question 20

This question concerns the linear flow with velocity function

$$V(x, y) = (x + y, 8x + 3y).$$

(a) Write down:

(i) the matrix  $A$  of the flow;

(ii) the first-order differential equations satisfied by the coordinate functions  $f, g$  of any flow function for this flow;

(iii) a second-order differential equation satisfied by  $f$  and  $g$ .

(b) Find the general solution of the differential equation in part (a)(iii).

(c) Determine the flow function  $\alpha$  corresponding to  $V$  which satisfies  $\alpha(0) = (2, 2)$ .

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[END OF QUESTION PAPER]