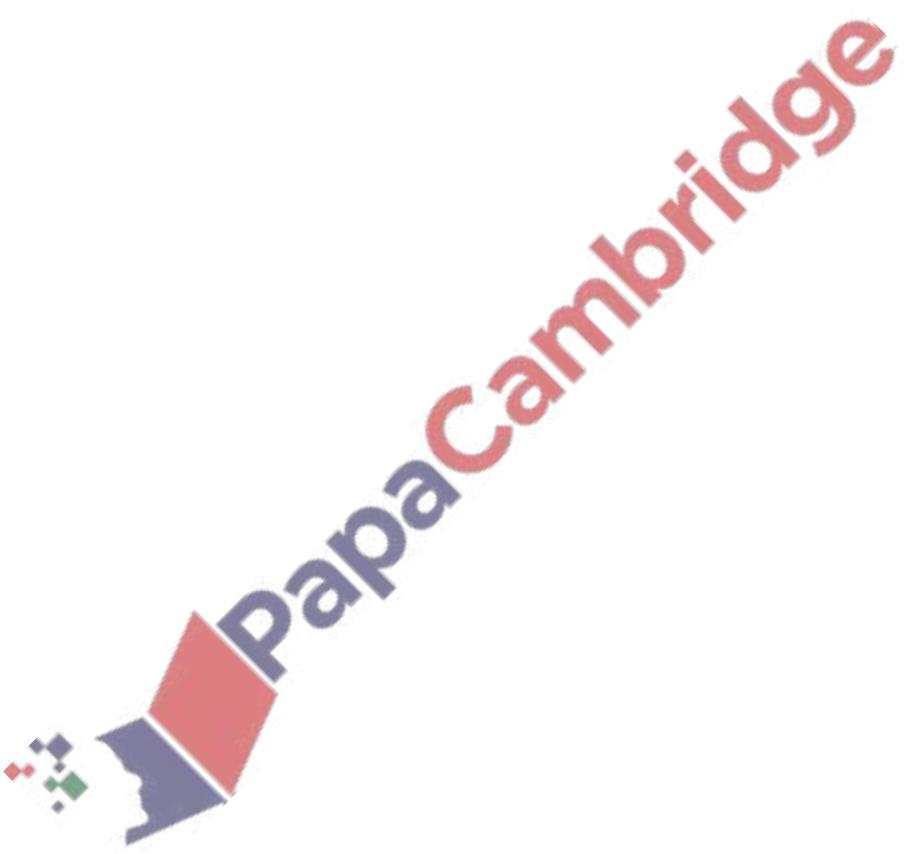


**1. Nov/2023/Paper\_9709/31/No.2**

On an Argand diagram, shade the region whose points represent complex numbers  $z$  satisfying the inequalities  $|z - 2i| \leq |z + 2 - i|$  and  $0 \leq \arg(z + 1) \leq \frac{1}{4}\pi$ . [4]

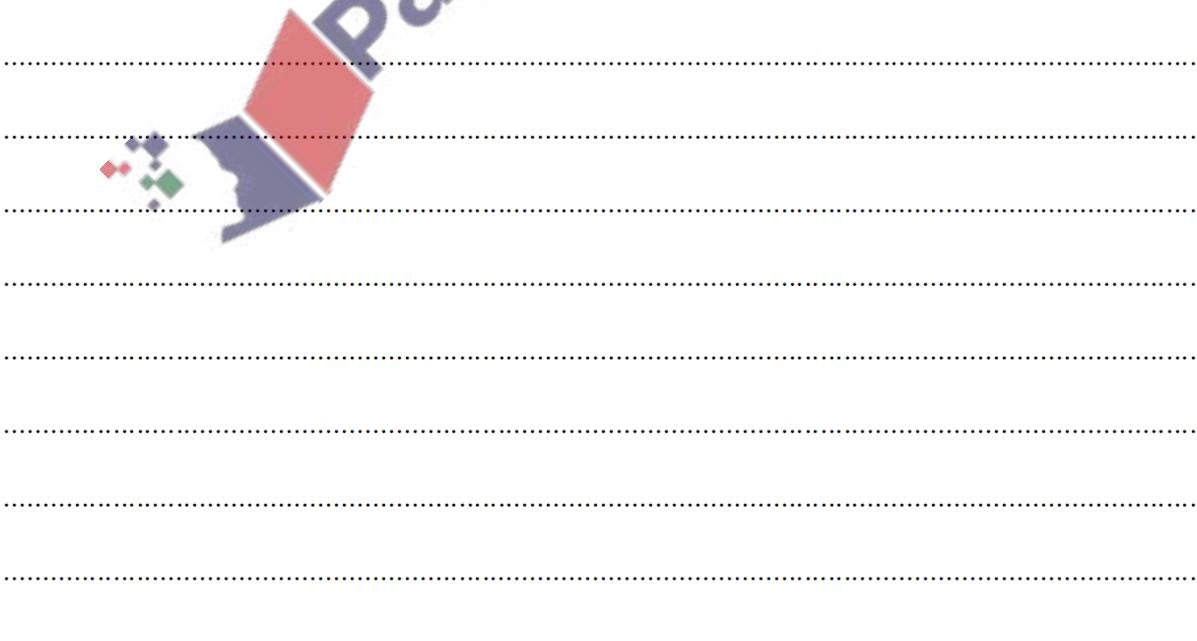


The complex number  $u$  is defined by  $u = \frac{3+2i}{a-5i}$ , where  $a$  is real.

(a) Express  $u$  in the Cartesian form  $x + iy$ , where  $x$  and  $y$  are in terms of  $a$ . [3]

Cambridge

(b) Given that  $\arg u = \frac{1}{4}\pi$ , find the value of  $a$ . [2]



(a) On a sketch of an Argand diagram, shade the region whose points represent complex numbers  $z$  satisfying the inequalities  $|z - 4 - 3i| \leq 2$  and  $\operatorname{Re} z \leq 3$ . [4]

(b) Find the greatest value of  $\arg z$  for points in this region. [2]

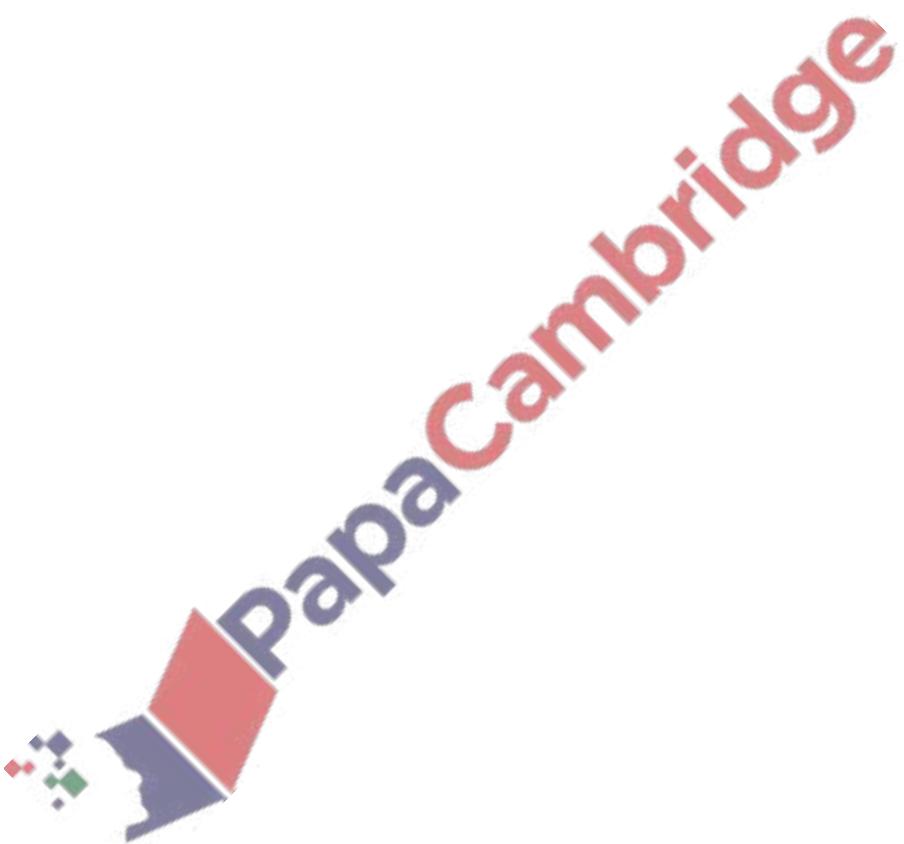
It is given that  $\frac{2 + 3ai}{a + 2i} = \lambda(2 - i)$ , where  $a$  and  $\lambda$  are real constants.

(a) Show that  $3a^2 + 4a - 4 = 0$ . [4]

(b) Hence find the possible values of  $a$  and the corresponding values of  $\lambda$ . [3]

5. Nov/2023/Paper\_9709/33/No.2

On an Argand diagram, shade the region whose points represent complex numbers  $z$  satisfying the inequalities  $|z - 1 + 2i| \leq |z|$  and  $|z - 2| \leq 1$ . [5]



6. Nov/2023/Paper\_9709/33/No.4

Solve the quadratic equation  $(3 + i)w^2 - 2w + 3 - i = 0$ , giving your answers in the form  $x + iy$ , where  $x$  and  $y$  are real. [5]