Complex Numbers – 2022 A2 Nov Math

1. Nov/2022/Paper_9709_31/No.2

On a sketch of an Argand diagram shade the region whose points represent complex numbers z satisfying the inequalities $|z| \le 3$, $\operatorname{Re} z \ge -2$ and $\frac{1}{4}\pi \le \arg z \le \pi$. [4]



Nov/2	2022/Paper_9709_31/No.5
The	complex numbers u and w are defined by $u = 2e^{\frac{1}{4}\pi i}$ and $w = 3e^{\frac{1}{3}\pi i}$.
(a)	Find $\frac{u^2}{w}$, giving your answer in the form $re^{i\theta}$, where $r > 0$ and $-\pi < \theta \le \pi$. Give the exact values of r and θ .
	20

(b)	State the least positive integer n such that both $\operatorname{Im} w^n = 0$ and $\operatorname{Re} w^n > 0$. [1]

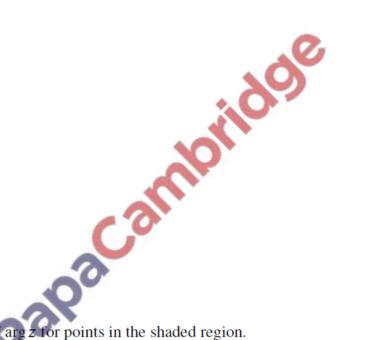
2.

The	complex numbers u and w are defined by $u = 2e^{\frac{1}{4}\pi i}$ and $w = 3e^{\frac{1}{3}\pi i}$.
(a)	Find $\frac{u^2}{w}$, giving your answer in the form $re^{i\theta}$, where $r > 0$ and $-\pi < \theta \le \pi$. Give the exact values of r and θ .
	409
	100
(b)	State the least positive integer n such that both $\operatorname{Im} w^n = 0$ and $\operatorname{Re} w^n > 0$. [1]

3. Nov/2022/Paper_9709_32/No.5

4. Nov/2022/Paper_9709_:	33/No.5
---------------------------------	---------

(a) On a sketch of an Argand diagram, shade the region whose points represent complex numbers z satisfying the inequalities $|z + 2| \le 2$ and $\text{Im } z \ge 1$. [4]



(b)	Find the greatest value of arg z for points in the shaded region.	[2]
		· · · · · ·

5.	Nov/2022/Paper_9709_33/No.6 Solve the quadratic equation $(1-3i)z^2 - (2+i)z + i = 0$, giving your answers in the form $x+iy$, where x and y are real.