

AQA – Complex numbers – A2 Further Mathematics P2

1. [June/2021/Paper_7367/2/No.2](#)

Find $\arg(-4 - 7i)$ to the nearest degree.

Circle your answer.

[1 mark]

-120°

-60°

30°

60°

2. June/2021/Paper_7367/2/No.8

The complex number z satisfies the equations

$$|z^* - 1 - 2i| = |z - 3|$$

and

$$|z - a| = 3$$

where a is real.

Show that a must lie in the interval $[1 - s\sqrt{t}, 1 + s\sqrt{t}]$, where s and t are prime numbers.

[6 marks]

3. June/2021/Paper_7367/2/No.13

- (a) Two of the solutions to the equation $\cos 6\theta = 0$ are $\theta = \frac{\pi}{4}$ and $\theta = \frac{3\pi}{4}$

Find the other solutions to the equation $\cos 6\theta = 0$ for $0 \leq \theta \leq \pi$

[2 marks]

- (b) Use de Moivre's theorem to show that

$$\cos 6\theta = 32 \cos^6 \theta - 48 \cos^4 \theta + 18 \cos^2 \theta - 1$$

[5 marks]

- (c) Use the fact that $\theta = \frac{\pi}{4}$ and $\theta = \frac{3\pi}{4}$ are solutions to the equation $\cos 6\theta = 0$ to find a factor of $32 \cos^6 \theta - 48 \cos^4 \theta + 18 \cos^2 \theta - 1$ in the form $(a \cos^2 \theta + b)$, where a and b are integers.

[4 marks]