

Complex numbers Problems (Calculator free)

1. Solve $z^2 = 48 - 14i, z \in C$. Express your answer in Cartesian form.
2. Solve $z^2 + iz - 6 = 5z - i$
 - 2.1 $z \in R$
 - 2.2 $z \in C$
3. Describe and graph the locus represented by each of the following. Show your workings :
 - 3.1 $|z - i| = 2$
 - 3.2 $|z + 2i| + |z - 2i| = 6$
 - 3.3 $|z - 3| - |z + 3| = 4$
 - 3.4 $z(\bar{z} + 2) = 3$
 - 3.5 $\text{Im}\{z^2\} = 4$
 - 3.6 $\left| \frac{z-3}{z+3} \right| < 2$
 - 3.7 $\text{Arg}(z-1) < \pi$

Ans

(1) $7-i, -7+i$

(2.1) -1 (2.2) $-1, 6-i$

(3.1) circle centre $(0,1)$, radius 2

(3.2) ellipse centre $(0,0)$ semi-major axis 3 , semi-minor axis $\sqrt{5}$

(3.3) hyperbola centre $(0,0)$, vertices $(-2,0), (2,0)$, asymptotes $y = \pm \frac{\sqrt{5}}{2}x$

(3.4) 2 points $(1,0), (-3,0)$

(3.5) hyperbola $y = \frac{2}{x}$, asymptotes $x = 0, y = 0$

(3.6) points external to circle centre $(-5,0)$, radius 4

(3.7) all points on the argand diagram except the ray from $(1,0)$ to the left