

Question: 7

If $P(z) = z^3 + bz^2 + cz - 2a^3$ and $P(a - ai) = 0$ where a , b and c are real numbers then

- a) $b = -3a$ and $c = 0$ b) $b = -3a$ and $c = 4a^2$
c) $b = 3a$ and $c = 4a^2$ d) $b = -a$ and $c = 0$
e) $b = a$ and $c = -4a^2$

Question: 8

If $z_1 = a + bi$ and $z_2 = a - bi$ where a and b are non-zero real numbers, which of the following statements is **false**?

- a) $|z_1| = |z_2|$ b) $\bar{z}_1 = z_2$ and $\bar{z}_2 = z_1$
c) $\text{Arg}(z_1) + \text{Arg}(z_2) = 0$ d) $\text{Im}(z_1^2 + z_2^2) = 0$
e) $\text{Re}((z_1 + z_2)^2) = 0$

Question: 9

If $P(z)$ is a polynomial in z of degree 5 with real coefficients, then which one of the following could be true?

- a) $P(z) = 0$ can have two real roots and three complex roots.
b) $P(z) = 0$ can have three real roots and one pair of complex conjugates roots
c) $P(z) = 0$ can have four real roots and one complex root.
d) $P(z) = 0$ can have five complex roots.
e) $P(z) = 0$ can have no real roots.

Question: 10

The set of points in the complex plane defined by $|z - 4| = |z + 2i|$ corresponds to:

- a) The circle with centre $4 - 2i$ and radius 1
b) The circle with centre $-4 + 2i$ and radius 1
c) The point given by $4 - 2i$
d) The point given by $-4 + 2i$
e) The straight line given by $\text{Im}(z) + 2\text{Re}(z) = 3$