T **Complex Numbers Test 1A** Teachers Teaching with Technology'

Name:

7 8 9 10 11 12

Navigator







Question: 1

Which of the following does **not** equal -1?

i⁶ b) $cis(-\pi)$ a) c) $\operatorname{cis}\left(-\frac{2\pi}{3}\right) + \operatorname{cis}\left(\frac{2\pi}{3}\right)$ d) $\operatorname{cis}\left(-\frac{\pi}{3}\right) + \operatorname{cis}\left(\frac{\pi}{3}\right)$ e) $cis(\pi)$

Question: 2

The principal argument of $-\sqrt{2}(1+\sqrt{3})+\sqrt{2}(1-\sqrt{3})i$ is: a) $\frac{\pi}{12}$ b) $\frac{11\pi}{12}$ c) $-\frac{11\pi}{12}$ d) 4 e) -4

Question: 3

If $z = \cos(\theta) + i\sin(\theta)$ and $z^3 - pi = 0$ where $|p| \le 1$, then the value of $\sin(3\theta)$ is equal to: a) p^{3} b) $\sqrt[3]{p}$ c) p d) 0 e) *i*

Question: 4

If z = -a - ai where $a \in R^+$ then $\operatorname{Arg}(z^5)$ is equal to: a) $\left(-\frac{3\pi}{4}\right)^{5}$ b) $-\frac{5\pi}{4}$ c) $-\frac{15\pi}{4}$ d) $-\frac{\pi}{4}$ e) $\frac{\pi}{4}$

Question: 5

If
$$z = 3\operatorname{cis}\left(\frac{\pi}{7}\right)$$
 then $(\overline{z})^{-1}$ is equal to:
a) $\frac{1}{3}\operatorname{cis}\left(\frac{\pi}{7}\right)$ b) $\frac{1}{3}\operatorname{cis}\left(-\frac{\pi}{7}\right)$ c) $\frac{1}{3}\operatorname{cis}\left(\frac{7}{\pi}\right)$ d) $-3\operatorname{cis}\left(-\frac{7}{\pi}\right)$ e) $-3\operatorname{cis}\left(\frac{7}{\pi}\right)$

Question: 6

Which of the following could **not** represent the complex number $-\sqrt{3}-i$

a)
$$-2\operatorname{cis}\left(\frac{13\pi}{6}\right)$$
 b) $2\operatorname{cis}\left(\frac{7\pi}{6}\right)$ c) $2\operatorname{cis}\left(-\frac{5\pi}{6}\right)$ d) $-2\operatorname{cis}\left(\frac{5\pi}{6}\right)$ e) $-2\operatorname{cis}\left(\frac{\pi}{6}\right)$

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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 = 0b) 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) $\overline{z_1} = z_2$ and $\overline{z_2} = z_1$ c) $\operatorname{Arg}(z_1) + \operatorname{Arg}(z_2) = 0$ d) $\operatorname{Im}(z_1^2 + z_2^2) = 0$ e) $\operatorname{Re}((z_1 + z_2)^2) = 0$

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 Im(z) + 2Re(z) = 3

