1. The smallest positive integer n for which $\left(\frac{1+i}{1-i}\right)^n = 1$, is

2. If the real part of the complex number $z = \frac{3+2i\cos\theta}{1-3i\cos\theta}, \theta \in \left(0, \frac{\pi}{2}\right)$ is zero, then the value of $\sin^2 3\theta + \cos^2\theta$ is equal to ______.

3. If $\left|\frac{z-25}{z-1}\right| = 5$, find the value of $|z|$

(1) 3
(2) 4
(3) 5
(4) 6

4. If $\frac{z-\alpha}{z+\alpha}$ is purely imaginary and $|z| = 2$ then α is $(\alpha \in R)$

(1) 2
(2) 4
(3) 3
(4) 1

5. The region represented by $\{z = x + iy \in C : |z| - \operatorname{Re}(z) \leq 1\}$ is also given by the inequality

(1) $y^2 \geq 2(x+1)$
(2) $y^2 \leq 2\left(x + \frac{1}{2}\right)$
(3) $y^2 \leq \left(x + \frac{1}{2}\right)$
(4) $y^2 \geq x + 1$

6. The principal argument of the complex number $\frac{(1+\mathrm{i})^5\left(1+\sqrt{3}\mathrm{i}\right)^2}{-2\mathrm{i}\left(-\sqrt{3}+\mathrm{i}\right)}$ is

(1) $\frac{19\pi}{12}$
(2) $-\frac{7\pi}{12}$
(3) $-\frac{5\pi}{12}$
(4) $\frac{5\pi}{12}$

7. If $|z+4| \leq 3$, then the greatest and the least value of $|z+1|$ are

(1) $-1, 6$
(2) $6, 0$
(3) $6, 3$
(4) none of these

8. The maximum value of $|z|$ where $z$satisfies the condition $\left|z + \frac{2}{z}\right| = 2$, is

(1) $\sqrt{3} - 1$
(2) $\sqrt{3} + 1$
(3) $\sqrt{3}$
(4) $\sqrt{2} + \sqrt{3}$

9. The equation $z^2 = \bar{z}$ has

(1) No solution
(2) Two solutions
(3) Four solutions
(4) An infinite number of solutions

10. The complex number which satisfy the equation $z + \sqrt{2}|z+1| + i = 0$ is

(1) $4 - i$
(2) $4 + i$
(3) $-2 - i$
(4) $2 + i$