1. Convert $\frac{(i+1)}{\left(\cos\frac{\pi}{4}-i\sin\frac{\pi}{4}\right)}$ in polar form.

(1) $\cos\left(\frac{\pi}{4}\right)+i\sin\left(\frac{\pi}{4}\right)$
(2) $\cos\left(\frac{\pi}{2}\right)-i\sin\left(\frac{\pi}{2}\right)$
(3) $\sqrt{2}\left[\cos\left(\frac{\pi}{4}\right)+i\sin\left(\frac{\pi}{4}\right)\right]$
(4) $\sqrt{2}\left[\cos\left(\frac{\pi}{2}\right)+i\sin\left(\frac{\pi}{2}\right)\right]$

2. If $z_r=\cos\frac{2r\pi}{5}+i\sin\frac{2r\pi}{5}$, $r=0,\ 1,\ 2,\ 3,\ 4,\ \ldots$, then $z_1z_2z_3z_4z_5$ is equal to

(1) -1
(2) 0
(3) 1
(4) none of these

3. The value of $\left(\frac{-1+i\sqrt{3}}{1-i}\right)^{30}$ is :

(1) 6^5
(2) 2^{15} i
(3) -2^{15}
(4) -2^{15}i

4. If $\mathrm{x_r}=\cos\frac{\pi}{2^r}+\mathrm{i}\sin\frac{\pi}{2^r}$, $\mathrm{z_t}=\cos\frac{\pi}{3^t}+\mathrm{i}\sin\frac{\pi}{3^t}\mathrm{r}=1,\ 2,\ 3,\ \ldots.,\ \mathrm{t}=1,\ 2,\ 3,\ \ldots.$ The value of $(\mathrm{x_1x_2x_3}\ldots..\ \infty)^2(\mathrm{z_1z_2z_3}\ldots\ldots\infty)^4$ -

(1) 0
(2) 1
(3) -1
(4) i

5. $\left[\frac{1+\cos\left(\frac{\theta}{2}\right)-i\sin\left(\frac{\theta}{2}\right)}{1+\cos\left(\frac{\theta}{2}\right)+i\sin\left(\frac{\theta}{2}\right)}\right]^{4n}$ is equal to

(1) $\cos n\theta-i\sin n\theta$
(2) $\cos n\theta+i\sin\theta$
(3) $\cos 2n\theta-i\sin 2n\theta$
(4) $\cos 2n\theta+i\sin 2n\theta$

6. If $1,\ \omega,\ \omega^2$ are the cube roots of unity, then $\left(3+\omega^2+\omega^4\right)^6$ is equal to

(1) 64
(2) 729
(3) 2
(4) 0

7. Let ω be a complex number satisfying $2\omega+1=z$, where $z=\sqrt{-3}$. If $\begin{vmatrix}1 & 1 & 1\\ 1 & -\omega^2-1 & \omega^2\\ 1 & \omega^2 & \omega^7\end{vmatrix}=3k$,then the value of k is

(1) $-z$
(2) $\frac{1}{z}$
(3) -1
(4) 1

8. If $i=\sqrt{-1}$ then $4+5\left(-\frac{1}{2}+i\frac{\sqrt{3}}{2}\right)^{334}-3\left(\frac{1}{2}+i\frac{\sqrt{3}}{2}\right)^{365}$ is equal to -

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

9. If $z=\frac{\sqrt{3}}{2}+\frac{i}{2}(i=\sqrt{-1})$, then $\left(1+iz+z^5+iz^8\right)^9$ is equal to:

(1) 0
(2) 1
(3) $(-1+2i)^9$
(4) -1

10. Let z and w be two non-zero complex numbers such that $|z|=|w|$ and $\arg z+\arg w=\pi$ then z equals –

(1) ω
(2) $-\omega$
(3) $\overline{w}$
(4) $-\overline{w}$