

PRACTICE QUESTIONS - ANSWERS FOR SELECTED PROBLEMS

- (1) (a) $-4 + 2\pi i$, (b) $4(e^\pi - 1)$.
- (4) (a) 2π , (b) $\pi i/4$, (c) $-\pi i/2$
- (7) (a) removable singularity at $z = 0$. pole of order one and residue $1/\pi$ at $z = \pi/2$. (b) pole of order one and residue $1/8$ at $z = 1$. pole of order three and residue $-1/8$ at $z = 3$. (c) poles of order one at $z = 3i$ and $z = -3i$. residues are $(3i + 1)/(6i)$ and $(3i - 1)/(6i)$, respectively.
- (8) (a) 1 (c) removable singularity (in particular, residue is zero)
- (9) the function has poles of order one at $e^{i\pi/4}$, $ie^{i\pi/4}$, $-e^{i\pi/4}$ and $-ie^{i\pi/4}$. residues are $-16e^{-i\pi/4}$, $16ie^{-i\pi/4}$, $16e^{-i\pi/4}$ and $-16ie^{-i\pi/4}$, respectively.
- (10) (a) $-2\pi i$ (b) $2\pi i$ (c) $10\pi i$
- (11) (a) $\pi/4$ (b) $\pi/6$ (c) $\pi \operatorname{Im} \left[e^{2i\alpha} \left(\frac{i-2\alpha}{4\alpha^3} \right) - e^{-2\alpha} \left(\frac{1-2\alpha}{4\alpha^3} \right) \right]$ where $\alpha = \sqrt[4]{2}e^{i\pi/4}$.