

SIIT MAS210 First Semester 2006 Dr. Ruben Quiz 3

Each correct answer is 33 points. Each wrong answer is -8 points (1 point is given free)

Problem 1 Given the complex numbers $z = 2 - 3i$ and $w = 1 + i$, find u and v , given by

$$u = z\bar{w} \quad v = z/w.$$

(1) $u = 2 - 3i$, $v = -1/2 - (5/2)i$

(2) $u = 2 + 5i$, $v = -1 + 5i$

(3) $u = 3 + 4i$, $v = -2 + (1/3)i$

(4) $u = -3 - 10i$, $v = 1 - i$

(5) $u = -1 + 10i$, $v = 1 - i$

Problem 2 Write the following numbers in polar form $z = 3 - 3i$, $w = -\sqrt{3} + i$

(1) $z = 3\sqrt{2} \left(\cos\left(\frac{-\pi}{4}\right) + i \sin\left(\frac{-\pi}{4}\right) \right)$, $w = 2 \left(\cos\frac{5\pi}{6} + i \sin\frac{5\pi}{6} \right)$

(2) $z = 3\sqrt{2} \left(\cos\frac{\pi}{3} + i \sin\frac{\pi}{3} \right)$, $w = 2 \left(\cos\frac{\pi}{4} + i \sin\frac{\pi}{4} \right)$

(3) $z = \cos\left(\frac{-\pi}{4}\right) + i \sin\left(\frac{-\pi}{4}\right)$, $w = \cos\frac{\pi}{6} + i \sin\frac{\pi}{6}$

(4) $z = \sqrt{2} \left(\cos\left(\frac{\pi}{4}\right) + i \sin\left(\frac{\pi}{4}\right) \right)$, $w = \cos\frac{\pi}{9} + i \sin\frac{\pi}{9}$

(5) $z = 3 \left(\cos\left(\frac{\pi}{4}\right) + i \sin\left(\frac{\pi}{4}\right) \right)$, $w = 3 \left(\cos\frac{\pi}{3} + i \sin\frac{\pi}{3} \right)$

Problem 3. Let $z = -1 + i$. Find $\sqrt[5]{z}$

(1) $z_1 = \sqrt{2} - i\sqrt{2}$, $z_2 = \sqrt{2} + i\sqrt{2}$, $z_3 = \sqrt{10} - i\sqrt{10}$, $z_4 = \sqrt{10} + i\sqrt{10}$, $z_{51} = \sqrt{2/5} - i\sqrt{2/5}$,

(2) $z_1 = \cos \pi/5 + i \sin \pi/5$, $z_2 = \cos \pi/10 + i \sin \pi/10$, $z_3 = \cos \pi/15 + i \sin \pi/15$,

(2) $z_4 = \cos \pi/20 + i \sin \pi/20$, $z_5 = \cos \pi/25 + i \sin \pi/25$

(3) $z_k = \sqrt{2} \left(\sqrt[5]{\frac{\cos k\pi}{5}} + i \sqrt[5]{\frac{\sin k\pi}{5}} \right)$, $k=0,1,2,3,4$

(4) $z_k = \sqrt[5]{10} \left(\cos\frac{\pi/6 + 2k\pi}{5} + i \sin\frac{\pi/6 + 2k\pi}{5} \right)$, $k=0,1,2,3,4$

(5) $z_1 = \sqrt[10]{2} \left(\cos\frac{3\pi}{20} + i \sin\frac{3\pi}{20} \right)$, $z_2 = \sqrt[10]{2} \left(\cos\frac{11\pi}{20} + i \sin\frac{11\pi}{20} \right)$, $z_3 = \sqrt[10]{2} \left(\cos\frac{19\pi}{20} + i \sin\frac{19\pi}{20} \right)$,

$z_4 = \sqrt[10]{2} \left(\cos\frac{-13\pi}{20} + i \sin\frac{-13\pi}{20} \right)$, $z_5 = \sqrt[10]{2} \left(\cos\frac{-5\pi}{20} + i \sin\frac{-5\pi}{20} \right)$