SIIT MAS210 First Semester 2006 Dr. Ruben Quiz 3

Each correct answer is 25 points. Each wrong answer is –6 points.

Problem 1 Given the complex numbers $z = 2 - 3i$, $w = 1 + i$, $u = z\overline{w}$ $v = z/w$. Then
(1) $u =$, $v =$
(2)
(3)
(4)
(5)

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

Problem 3. Let $z = -1 + i$. Find $\sqrt{z}$
(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) $z_k = \sqrt[5]{10}\left(\cos\frac{\pi/6 + 2k\pi}{5} + i\sin\frac{\pi/6 + 2k\pi}{5}\right)$, $k = 0,1,2,34$

(5) $z_1 = \sqrt[10]{2}\left(\cos\frac{3\pi}{20} + i\sin\frac{3\pi}{20}\right)$, $z_2 = \sqrt[10]{2}\left(\cos\frac{11\pi}{20} + i\sin\frac{11\pi}{20}\right)$, $z_3 = \sqrt[10]{2}\left(\cos\frac{19\pi}{20} + i\sin\frac{19\pi}{20}\right)$,
$z_4 = \sqrt[10]{2}\left(\cos\frac{-13\pi}{20} + i\sin\frac{-13\pi}{20}\right)$, $z_5 = \sqrt[10]{2}\left(\cos\frac{-13\pi}{20} + i\sin\frac{-13\pi}{20}\right)$

Problem 4. Let A be a matrix. Its reduced row-echelon matrix is (mark the correct answer)

$$\begin{bmatrix} 1 & 2 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

(1) The homogeneous system A**x = 0** has unique solution
(2) The rank of A is 5
(3) The column vectors of A are linearly independent
(4) The rank of A is 4
(5) We cannot know the rank of A unless we know A