PMT0201 Tutorial 2 (Part 4)

Q1 Plot the point that has the given polar coordinates.

a) $(4, \frac{\pi}{4})$ b) $(6, \frac{-\pi}{6})$ c) $(-2, \frac{\pi}{3})$

d) $(5, \frac{5\pi}{6})$ e) $(4, \frac{4\pi}{3})$ f) $(-4, -\frac{\pi}{4})$

Q2 From Q1, find the corresponding rectangular coordinates of the given polar coordinates.

Q3 Convert the rectangular coordinates to polar coordinates with $r > 0$ and $0 \le \theta < 2\pi$.

a) $(1-, 1)$ b) $(3\sqrt{3}, -3)$ c) $(-\sqrt{6}, \sqrt{2})$

d) $(3, 4)$ e) $(1, -2)$ f) $(0, -\sqrt{3})$

Q4 Write the complex number in polar form with argument between 0 and 2π.

a) $-3i$ b) 4 c) $7-3i$

d) $5+2i$ e) $-1-\frac{\sqrt{3}}{3}i$ f) $\frac{-\sqrt{2}+i\sqrt{2}}{2}$

g) $i(2-2i)$ h) $2\sqrt{3}-2i$ i) $3i$

Q5 Find the product zw and quotient $\frac{z}{w}$. Express your answer in polar form

a) $z = \cos\frac{\pi}{4} + i\sin\frac{\pi}{4}, \quad w = \cos\frac{3\pi}{4} + i\sin\frac{3\pi}{4}$

b) $z = 7\left(\cos\frac{9\pi}{8} + i\sin\frac{9\pi}{8}\right), \quad w = 2\left(\cos\frac{\pi}{8} + i\sin\frac{\pi}{8}\right)$

c) $z = \frac{4}{5}\left(\cos 25^\circ + i\sin 25^\circ\right), \quad w = \frac{1}{5}\left(\cos 155^\circ + i\sin 155^\circ\right)$

d) $z = 4\left(\cos 200^\circ + i\sin 200^\circ\right), \quad w = 25\left(\cos 150^\circ + i\sin 150^\circ\right)$

Q6 Write z and w in polar form and then find the product zw and the quotients z/w and $1/z$. Leave your answer in polar form.

a) $z=\sqrt{2}-\sqrt{2}i,$ and $w=1+i$

b) $z=\sqrt{3}+i,$ and $w=1-\sqrt{3}i$

c) $z=-\sqrt{2}i,$ and $w=-3-3\sqrt{3}i$

d) $z=4\sqrt{3}-4i,$ and $w=4$

e) $z=-20,$ and $w=-2-2i$

Q7 Find the indicated power using De Moivre's Theorem

a) $(1-i)^8$

b) $(2\sqrt{3}+2i)^5$

c) $\left(-\frac{1}{2}-\frac{\sqrt{3}}{2}i\right)^{15}$

d) $(-1+i)^{-5}$

e) $\left(-\sqrt{3}-i\right)^{-5}$

f) $\left(-1+\sqrt{3}i\right)^{-7}$

Q8 Find the indicated roots, and graph the roots in the complex plane

a) The square roots of $4\sqrt{3}+4i$

b) The fifth roots 32.

c) The fourth roots $-81i$

d) The eight roots of $1-i$