

Polar Coordinates and Complex Numbers

POLAR COORDINATES AND COMPLEX NUMBERS

40. Convert the following into rectangular form.

a. $(6, 90^\circ)$ b. $\left(2, \frac{\pi}{6}\right)$

41. Convert the following into polar form:

a. $(3, 3)$ b. $(-1, -\sqrt{3})$ c. $(0, -2)$

42. If $z_1 = \sqrt{3} - i$ and $z_2 = 4 + 4i$, find z_1 , z_2 , and $z_1 z_2$ in polar form.

43. If $z = (4, 30^\circ)$, find the following in $a + bi$ form:

a. z^3 b. z^5 c. z^{-2}

44. Find the cube roots of $\sqrt{3} + i$.

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Answers

40a. $6i$

40b. $\sqrt{3} + i$

41a. $\left(3\sqrt{2}, \frac{\pi}{4}\right)$

41b. $\left(2, \frac{4\pi}{3}\right)$

41c. $\left(2, \frac{3\pi}{2}\right)$

42. $z_1 = 2 \operatorname{cis} \frac{11\pi}{6}; z_2 = 4\sqrt{2} \operatorname{cis} \frac{\pi}{4}; z_1 z_2 = 8\sqrt{2} \operatorname{cis} \frac{\pi}{12}$

43a. $64i$

43b. $-512\sqrt{3} + 512i$

43c. $\frac{1}{32} - \frac{\sqrt{3}}{32}i$

44. $\sqrt[3]{2} \cdot \operatorname{cis} 10^\circ, \sqrt[3]{2} \cdot \operatorname{cis} 130^\circ, \sqrt[3]{2} \cdot \operatorname{cis} 250^\circ$