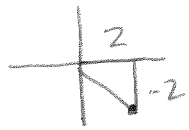


Math 112: #35 A/B/C/DA) Write $z = 2 - 2i$ in trigonometric form with $\theta \in [0, 2\pi)$, and write $w = 4\left(\cos\frac{5\pi}{3} + i\sin\frac{5\pi}{3}\right)$ in standard form.

$$z = 2 - 2i \quad r = \sqrt{(2)^2 + (-2)^2} = \sqrt{4+4} = \sqrt{8} = 2\sqrt{2}$$

$$\tan\theta = \frac{-2}{2} = -1 \quad \theta = -\frac{\pi}{4} \text{ or } \frac{5\pi}{4} \text{ since } \theta \in [0, 2\pi)$$

$$z = 2\sqrt{2}\left(\cos\frac{5\pi}{4} + i\sin\frac{5\pi}{4}\right)$$



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

B) Write $z = 0 - 7i$ in trigonometric form with $\theta \in [0, 2\pi)$, and write $w = \frac{3}{2}\left(\cos\frac{11\pi}{4} + i\sin\frac{11\pi}{4}\right)$ in standard form.

$$z = 0 - 7i$$

$$r = 7$$

$$\tan\theta = \text{und} \quad \theta = \frac{-\pi}{2} \text{ or } \frac{3\pi}{2}$$

$$z = 7\left(\cos\frac{3\pi}{2} + i\sin\frac{3\pi}{2}\right)$$



$$w = \frac{3}{2}\left(\cos\frac{11\pi}{4} + i\sin\frac{11\pi}{4}\right) = \frac{3}{2}\left(-\frac{\sqrt{2}}{2} + i\frac{\sqrt{2}}{2}\right) = -\frac{3\sqrt{2}}{4} + \frac{3i\sqrt{2}}{4}$$



C) Write $z = -\sqrt{3} + i\sqrt{3}$ in trigonometric form with $\theta \in [0, 2\pi)$, and write

$w = 5\left(\cos\frac{25\pi}{6} + i\sin\frac{25\pi}{6}\right)$ in standard form.

$$z = -\sqrt{3} + i\sqrt{3}$$



$$r = \sqrt{3+3} = \sqrt{6}$$

$$\theta = \frac{3\pi}{4}$$

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

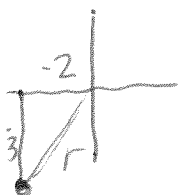
$$w = 5 \left(\cos \frac{25\pi}{6} + i \sin \frac{25\pi}{6} \right) = 5 \left(\frac{\sqrt{3}}{2} + i \cdot \frac{1}{2} \right) = \frac{5\sqrt{3}}{2} + \frac{5i}{2}$$



D) Write $z = -2 - 2i\sqrt{3}$ in trigonometric form with $\theta \in [0, 2\pi)$, and write

$w = \sqrt{8} \left(\cos \frac{-13\pi}{3} + i \sin \frac{-13\pi}{3} \right)$ in standard form.

$$z = -2 - 2i\sqrt{3}$$

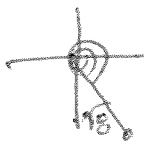


$$r = \sqrt{(-2)^2 + (-2\sqrt{3})^2} = \sqrt{16} = 4$$

$$\tan \theta = \frac{-2\sqrt{3}}{-2} = \sqrt{3} = \frac{4\pi}{3}$$

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

$$w = \sqrt{8} \left(\cos \frac{-13\pi}{3} + i \sin \frac{-13\pi}{3} \right) = \sqrt{8} \left(\frac{1}{2} + i \cdot \frac{-\sqrt{3}}{2} \right) = 2\sqrt{2}$$



$$= \sqrt{2} - i\sqrt{6}$$