

Name: _____

Operations with Complex Numbers

Exercise 1: Given: $z_1 = 5 + i\sqrt{2}$ and $z_2 = 3 + i\sqrt{5}$

1. Find modulus $\left| \frac{z_1}{z_2} \right|$
2. Find the $\arg\left(\frac{z_1}{z_2}\right)$
3. Find $\frac{z_1}{z_2}$ and represent it graphically

Exercise 2: Find $z_1 \bullet z_2$ and $\frac{z_1}{z_2}$

1. $z_1 = 5cis\frac{\pi}{3}; z_2 = \sqrt{2}cis\frac{\pi}{4}$
2. $z_1 = 7cis\frac{2\pi}{3}; z_2 = \sqrt{5}cis\frac{5\pi}{12}$
3. $z_1 = -6cis\frac{4\pi}{5}; z_2 = \sqrt{6}cis\frac{2\pi}{5}$
4. $z_1 = cis\frac{\pi}{2}; z_2 = 5cis\frac{3\pi}{4}$
5. $z_1 = 5\sqrt{2}cis\frac{\pi}{3}; z_2 = \frac{1}{2}cis\pi$
6. $z_1 = \frac{1}{4}cis\frac{\pi}{4}; z_2 = \frac{4}{7}cis\frac{\pi}{3}$
7. $z_1 = \frac{5}{6}cis\frac{6\pi}{11}; z_2 = \frac{2}{5}cis\frac{3\pi}{10}$

Exercise 3: Convert to trigonometric form then find the product

- 1) $z_1 = 1 + i; z_2 = \frac{1}{2} + \frac{\sqrt{3}}{2}i$
- 2) $z_1 = -1 - i; z_2 = \frac{-1}{2} - \frac{\sqrt{3}}{2}i$
- 3) $z_1 = i; z_2 = \frac{\sqrt{2}}{2} - \frac{\sqrt{2}}{2}i$