

Name: _____

Operations with Complex Numbers

Exercise 1: Find the product of $z_1 \cdot z_2$ and $z_2 \cdot z_1$. Compare your answers in each case.

$$1. \quad z_1 = 4cis \frac{\pi}{3}; z_2 = \sqrt{5}cis \frac{\pi}{4}$$

$$2. \quad z_1 = 3cis \frac{\pi}{10}; z_2 = 7cis \frac{\pi}{12}$$

$$3. \quad z_1 = 6\sqrt{2}cis \frac{\pi}{5}; z_2 = \sqrt{6}cis \frac{2\pi}{5}$$

$$4. \quad z_1 = \sqrt{2}cis \frac{\pi}{6}; z_2 = \frac{1}{2}cis \frac{\pi}{3}$$

$$5. \quad z_1 = \frac{5\sqrt{2}}{7}cis \frac{2\pi}{3}; z_2 = \frac{1}{2}cis \pi$$

$$6. \quad z_1 = \frac{3}{4}cis \frac{3\pi}{8}; z_2 = \frac{5}{7}cis \frac{8\pi}{13}$$

Exercise 2: Write each complex number in trigonometric form, then perform the indicated operation. Write the final answer in standard form.

$$1) \quad (2+2i)(1-i)$$

$$2) \quad (\sqrt{3}+i)(1+i)$$

$$3) \quad (i-8)(3-2i)$$

$$4) \quad \frac{5}{2+3i}$$

$$5) \quad \frac{1+\sqrt{3}i}{6-3i}$$

$$6) \quad \frac{4i}{-4+2i}$$

Exercise 3: Given that $z_1 = \sqrt{11}cis\frac{2\pi}{5}$; $z_2 = 3cis\frac{\pi}{10}$; $z_3 = \sqrt{2}cis\frac{\pi}{2}$ find :

1) $z_1 \bullet z_2$

2) $\frac{z_1}{z_2}$

3) $\frac{z_1 \bullet z_2}{z_3}$

4) $\frac{z_1 \bullet z_3}{z_2}$

5) $\frac{z_3 \bullet z_2}{z_1}$