Adding and Subtracting Complex Numbers

1. $(3 - 4\text{i}) + (5 + 2\text{i})$

2. $(3 + 4\text{i}) - (5 - 2\text{i})$

3. $(2 - 7\text{i}) - (4 + 3\text{i})$

Multiplying Complex Numbers

1. $(3 - 4\text{i}) \times (5 + 2\text{i})$

2. $(2 + 7\text{i}) \times (4 - 3\text{i})$

Dividing Complex Numbers

1. $\dfrac{5 - 2\text{i}}{3 + 4\text{i}}$

2. $\dfrac{4 + 3\text{i}}{2 - 6\text{i}}$

Polar Form

Find the polar form of the following complex numbers:

1. $1 + 1\text{i}$

2. $0 - 2\text{i}$

3. $3 + 4\text{i}$

4. $3 - 2\text{i}$

Find the $a + bi$ form of the following complex numbers:

1. $1\angle\frac{\pi}{2}$

2. $7\angle\frac{5\pi}{3}$

3. $5\angle\frac{3\pi}{4}$

4. $3\angle\pi$

Exponentiation

1. $(1 - 1\text{i})^3$

2. $(5 + 2\text{i})^2$

3. $(8 - 4\text{i})^7$

4. $(3 + 7\text{i})^9$

The Riemann Hypothesis

Prove or disprove the following statement:

The nontrivial zeros of $\zeta(s)$ *have real part equal to* $\frac{1}{2}$.

Where:

$$\zeta(s) = \sum_{n=1}^{\infty} \frac{1}{n^s} \left\{ s \in \mathbb{C} \mid \mathrm{Re}(s) > 1 \right\}$$

$$\zeta(s) = 2^s \pi^{s-1} \sin\left(\frac{\pi s}{2}\right) \Gamma(1-s) \zeta(1-s) \left\{ s \in \mathbb{C} \mid s \neq 1 \right\}$$

