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JC MATHEMATICS (H2) STUDY TIPS

HOW COMPLEX NUMBER
ARGUMENTS PERFECTLY
MIRROR LOGARITHMIC RULES

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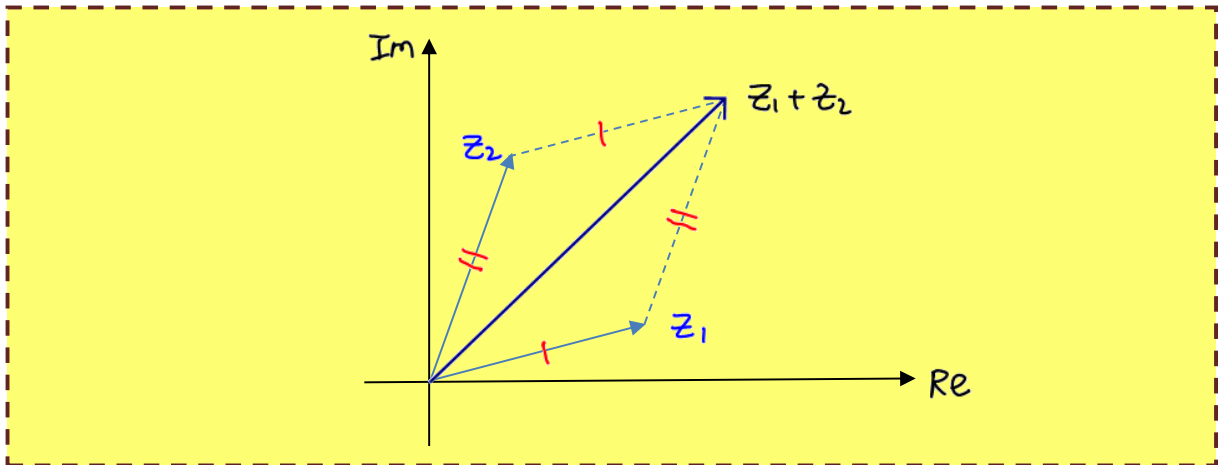


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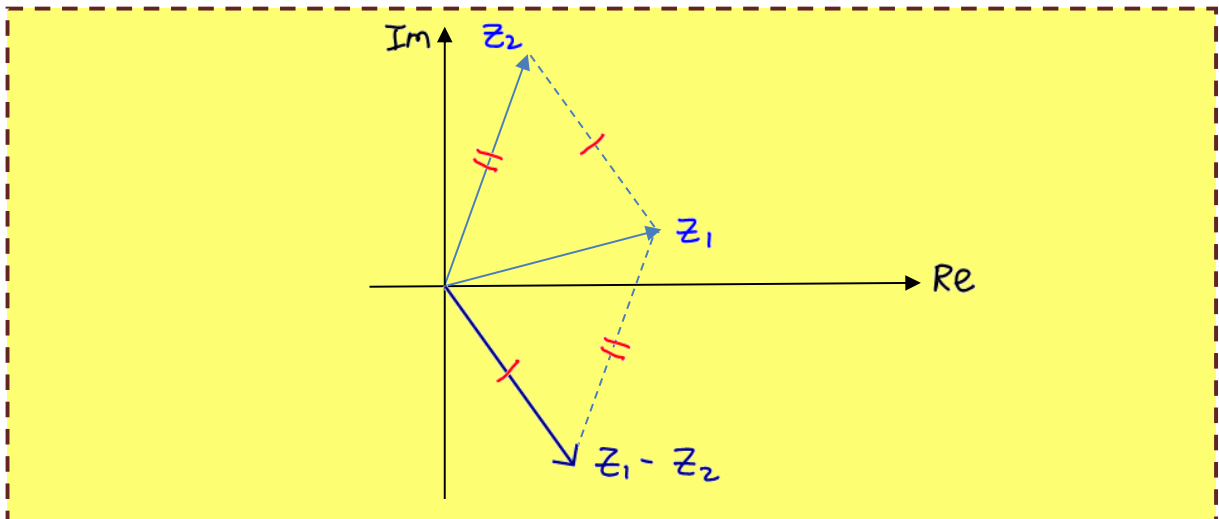
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- Addition



- Subtraction



- Multiplication

$$|z_1 z_2| = |z_1| |z_2|$$

$$\arg(z_1 z_2) = \arg z_1 + \arg z_2$$

- Division

$$\left| \frac{z_1}{z_2} \right| = \frac{|z_1|}{|z_2|}$$

$$\arg\left(\frac{z_1}{z_2}\right) = \arg(z_1) - \arg(z_2)$$



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Explanation

The argument of a complex number behaves remarkably like a logarithm because it transforms geometric and algebraic combinations into straightforward addition and subtraction.

When you multiply two complex numbers, you calculate the overall argument by simply adding the individual arguments together, which perfectly mirrors the logarithmic rule where the logarithm of a product equals the sum of the separate logarithms.

Similarly, dividing one complex number by another corresponds to subtracting the argument of the denominator from the argument of the numerator, mimicking how a logarithm converts division into subtraction.

Finally, raising a complex number to a power translates to multiplying its argument by that specific exponent, which directly matches the logarithmic property where an exponent can be pulled out in front as a scaling multiplier.

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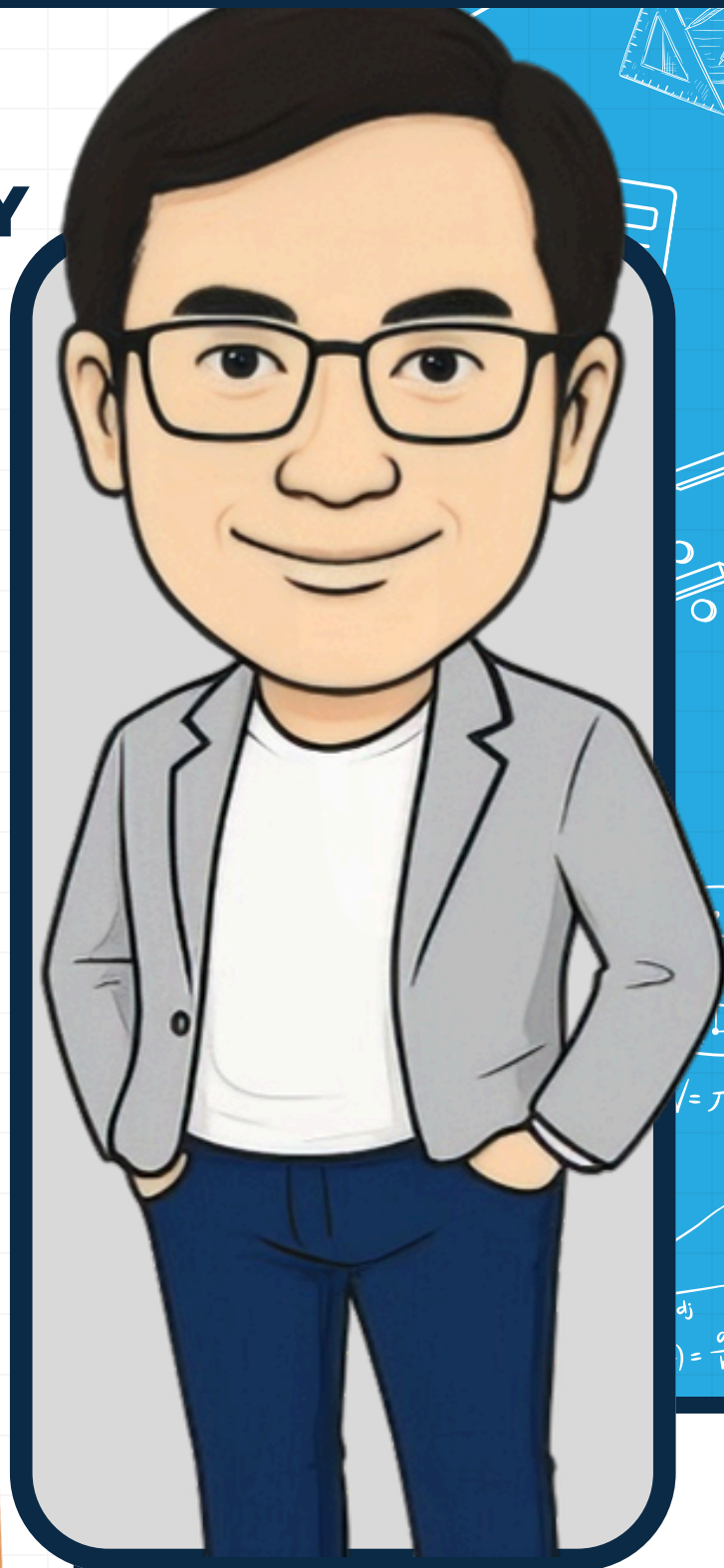
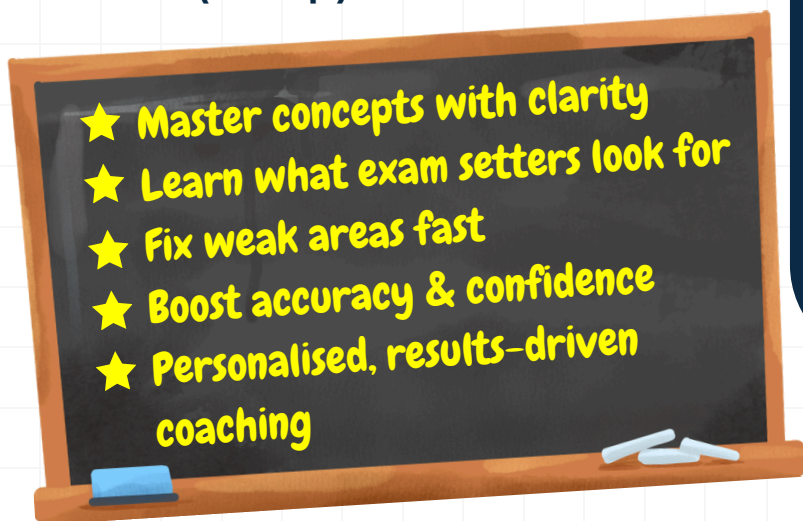
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