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| **Year 11 Specialist Mathematics**  Semester 2, October 2021  **Test 6: Complex Numbers and Number Proofs**  **Calculator Free Section Weighting: 6%**  **[Australian Curriculum Reference Numbers: 2.3.1 - 2.3.16]**  **Total Marks =** |

**Total Time: 25min** Marks **=**

**Student Name:**

**Teacher: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**INSTRUCTIONS TO STUDENTS:**

* You **are not allowed** a calculator or any notes.
* A formula booklet will be provided.

You are required to attempt ALL questions.

Write answers in the spaces provided beneath each question.

Marks are shown with the questions.

**Show all working** clearly, in sufficient detail to allow your answers to be checked readily and for marks to be answered for reasoning. Incorrect answers given without supporting reasoning cannot be allocated any marks. For any question or part question worth more than two marks, valid working or justification is required to receive full marks.

1. Given that and , determine the following:   
    (express your answers in the form , where and are real)

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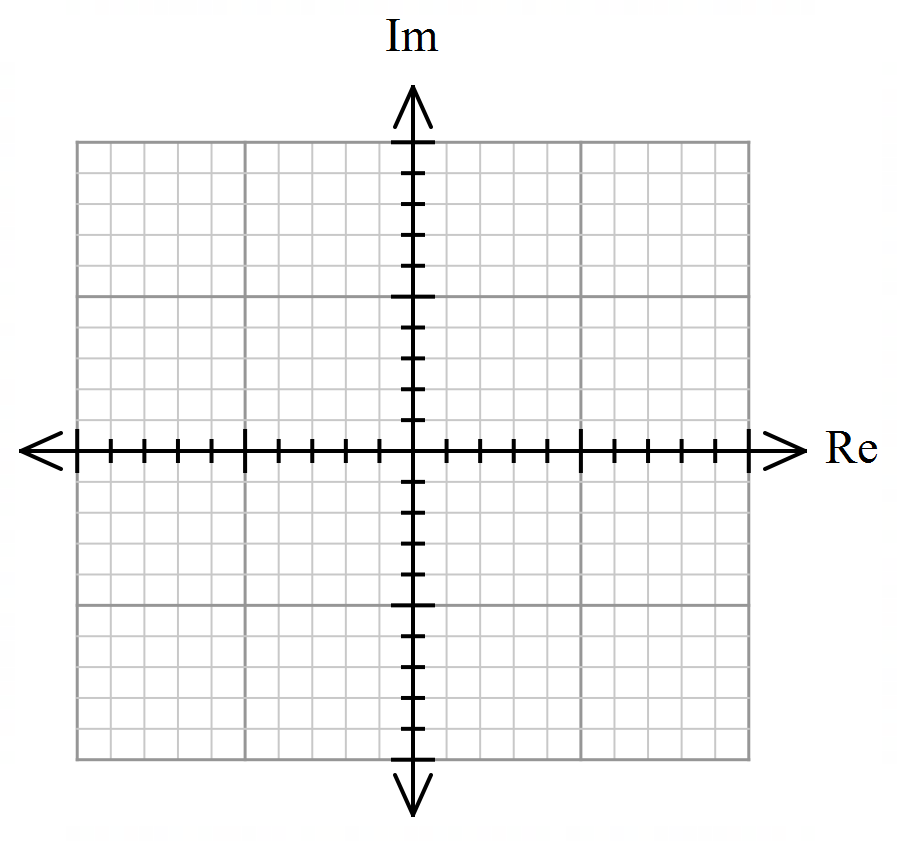
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[1,2,1,3,2 = 9 marks]

* 1. Solve over the complex plane.

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* 1. Sketch the solutions to on an argand diagram, labelling them

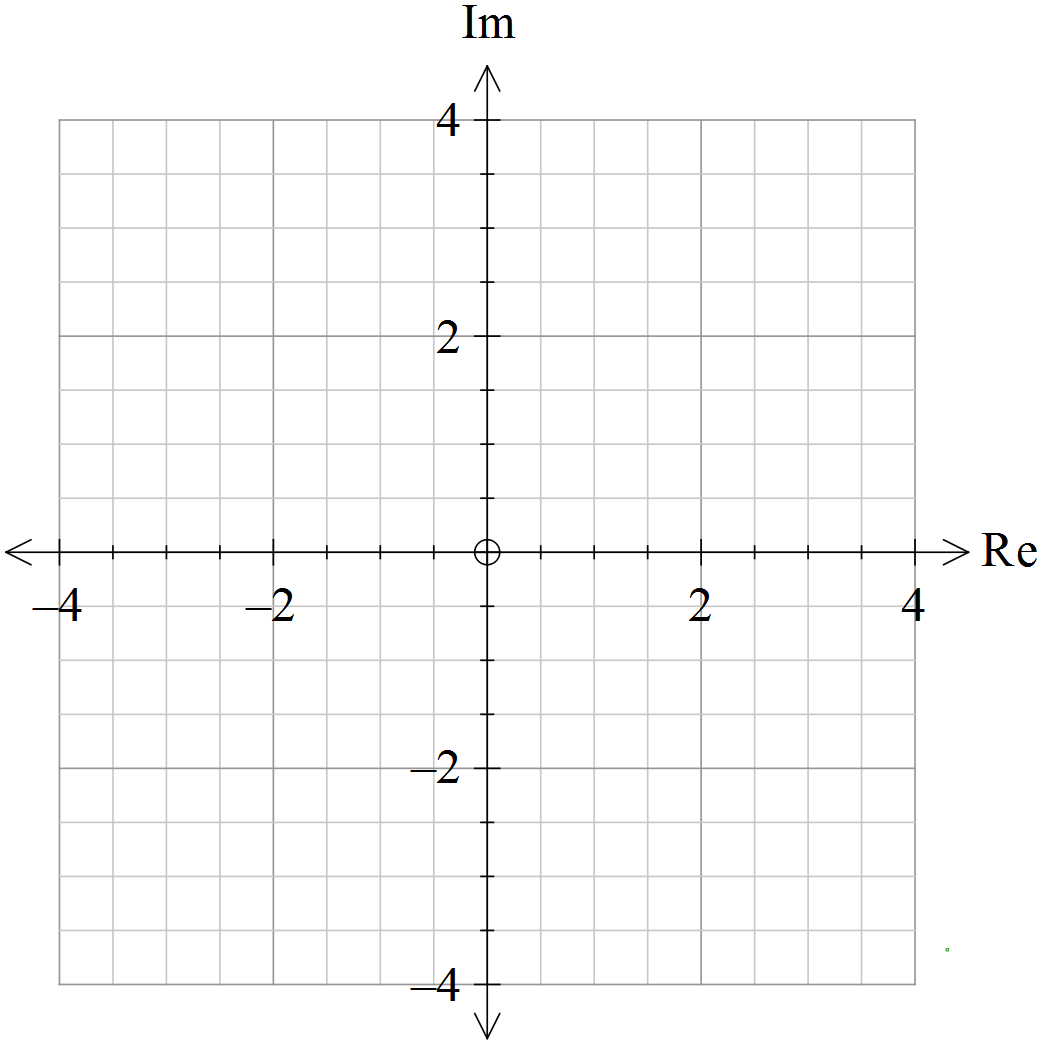
* 1. What geometric property do the complex roots of quadratic equations with real coefficients display?

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[3,2,1 = 6 marks]

1. Sketch the complex numbers as vectors on the Argand Diagram below.

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[8 marks]

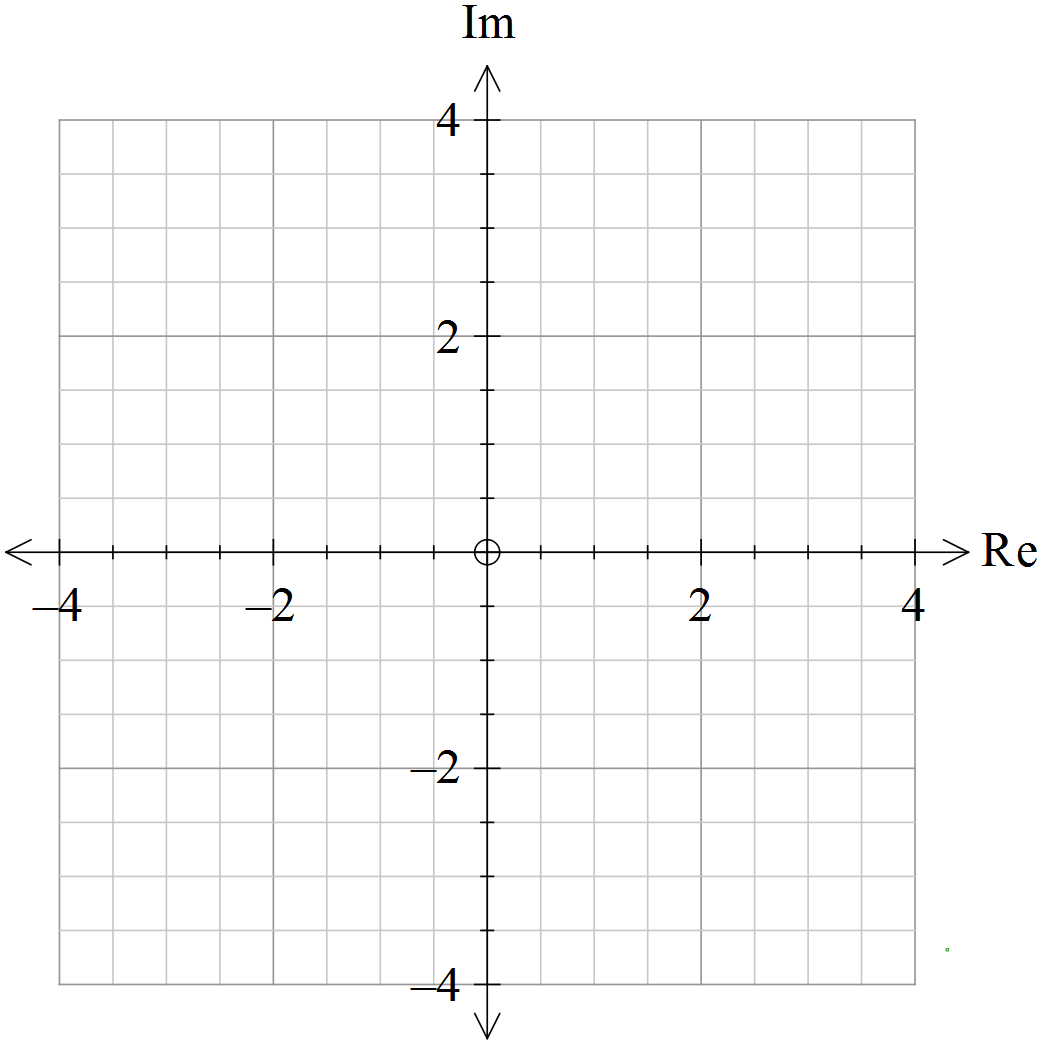
1. Convert the decimal into the form where have no common factors.

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[3 marks]

\*\*\* End of Test \*\*\*

\*\*\*Extra space for working out\*\*\*



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| **A picture containing text, furniture, table, seat  Description automatically generated****Year 11 Specialist Mathematics**  Semester 2, October 2021  **Test 6: Complex Numbers and Number Proofs**  **Calculator Allowed Section Weighting: 6%**  **[Australian Curriculum Reference Numbers: 2.3.1 - 2.3.16]** |

**Total Time: 25min Total Marks =**

**Student Name:**

**Teacher: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**INSTRUCTIONS TO STUDENTS:**

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You are required to attempt ALL questions.

Write answers in the spaces provided beneath each question.

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1. Use proof by exhaustion to prove that:

Hint: Consider integers as multiples of 3.

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**[ 8 Marks]**

1. Prove that any complex number multiplied by its conjugate will always give a real number.

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[3 marks]

1. For the Argand Diagrams below:

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| Diagram  Description automatically generated   * 1. Sketch | Diagram  Description automatically generated   * 1. Sketch |
| Diagram  Description automatically generated   * 1. Sketch | Diagram  Description automatically generated   * 1. Sketch |

[4 marks]

1. Prove that:

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**[7 Marks]**

\*\* End of Test \*\*

\*\*\*Extra space for working out\*\*\*

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