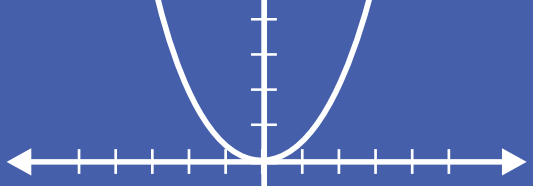

$V = \pi r^2 h$

COMPLEX NUMBERS

CALCULUS

LEVEL 3

Study Checklist

If you've picked up this checklist, congrats! You've begun the first step in a system of resources designed to help you through the Complex Numbers external. To make the most of this, we suggest you sit down, grab a pen, and mark any points that you're feeling a little unsure of. Then, create a subject audit using our template, or refer to the page numbers to find the section in our walkthrough guide to help you out!

SURDS

- [ ] I can explain what a surd is [TBC]
- [ ] I can explain the difference between a rational and an irrational number [TBC]
- [ ] I can explain why every square root has two values [TBC]
- [ ] I can simplify surds [TBC]
- [ ] I can explain what a conjugate is [TBC]
- [ ] I can explain what a compound surd is [TBC]
- [ ] I can explain why there's only one conjugate [TBC]
- [ ] I can add and subtract surds [TBC]
- [ ] I can identify like terms [TBC]
- [ ] I can multiply compound surds using FOIL [TBC]
- [ ] I can divide compound surds when the numerator is greater than 1 [TBC]

REAL AND COMPLEX NUMBERS

- [ ] I can explain what a factor is [TBC]
- [ ] I can explain what a remainder is [TBC]
- [ ] I can use the remainder theorem to find factors of polynomials [TBC]
- [ ] I can explain the link between factors and roots of a function [TBC]
- [ ] I can identify a quadratic equation [TBC]
- [ ] I can find solutions by using the Quadratic Formula [TBC]
- [ ] I can find the equation from the roots [TBC]
- [ ] I can find solutions by completing the square [TBC]
- [ ] I can find the nature of roots using the discriminant [TBC]
- [ ] I can find a range of numbers for where an equation has one, both, or no roots. [TBC]
- [ ] I can explain where the imaginary number comes from [TBC]

RECTANGULAR FORM

- [ ] I can add and subtract complex numbers in rectangular form [TBC]
- [ ] I can multiply complex numbers in rectangular form [TBC]
- [ ] I can divide complex numbers using conjugates [TBC]
- [ ] I can equate real and imaginary numbers to solve an equation [TBC]
- [ ] I can find the complex roots of polynomials using the quadratic formula, completing the square method, or remainder theorem [TBC]

SPECIAL TRIANGLES

- I can explain the difference between degrees and radians [TBC]
- I can convert degrees to radians and vice versa [TBC]
- I can explain why using radians has advantages over using degrees [TBC]
- I can remember the six trigonometric ratios based on an equilateral triangle [TBC]
- I can remember the three trigonometric ratios based on a right-angle triangle [TBC]

POLAR FORM

- I understand that complex numbers can be written in polar form, where $z=r \times \text{cis}\theta$ [TBC]
- I understand that $\text{cis}\theta$ is short for: $\cos\theta + i.\sin\theta$ [TBC]
- I can state the symbols for the 'modulus' and 'argument' [TBC]
- I can identify 'r' on an Argand diagram, and determine its value [TBC]
- I can identify 'θ' on an Argand diagram, and determine its value [TBC]
- I can express 'θ' from an Argand diagram as an angle between -180° and +180° [TBC]
- I can express a complex number in polar form using the values for 'r' and 'θ' [TBC]
- I can multiply complex numbers in polar form by multiplying the 'r' values and adding the 'θ' values [TBC]
- I can divide complex numbers in polar form by dividing the 'r' values and subtracting the 'θ' values [TBC]
- I can use De Moivre's Theorem to calculate the power of a complex number in polar form [TBC]
- I can use De Moivre's Theorem to find the 'n' root a complex number in polar form [TBC]
- I can use trigonometry to convert a complex number in rectangular form to polar form [TBC]
- I can use trigonometry to convert a complex number in polar form to rectangular form [TBC]
- I can convert a complex number in polar form to rectangular form by expanding $r \times \text{cis}\theta$ into $r.\cos\theta+(r.\sin\theta)i$ [TBC]

LOCI

- I can define a "locus" [TBC]
- I can use rectangular form to split 'z' into real and imaginary parts [TBC]
- I understand that "$|x + iy|$" represents the modulus of the locus [TBC]
- I can express the modulus of the locus ("$|x + iy|$") as: $\sqrt{(x^2+y^2)}$ [TBC]
- I can determine the equation of a locus, where the value of the modulus is given [TBC]
- I can calculate the gradient and y-intercept of a straight line in the form: $y = mx + c$ [TBC]
- I can calculate the position of the centre of a circle and its radius from its equation in the form: $(x - a)^2 + (y - b)^2 = r^2$ [TBC]
- I can determine what kind of conic section (straight line, circle, ellipse, hyperbola or parabola) is represented by the equation of a locus [TBC]
- I can draw the equation of a locus, where the locus represents a straight line or a circle [TBC]