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| Topic 1: Algebra | *Sequences and Series* |
| A sequence is a set of terms which follow a rule (pattern)  |  |
| Arithmetic Progression: Terms differ by a common difference,  |  |
|  |  |  |  |  |  |
| Sum of arithmetic progression |  |  |
| Geometric Progression: Terms differ by a common ratio,  |  |
|  |  |  |  |  |  |
| Sum of geometric progression |  | Sum of infinite geometric progression |  |
| Topic 1: Algebra | *Exponents and Logarithms* |
| Exponent (Index) Laws: | Logarithm Laws:  |
|  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |
| Graphs of exponential functions and  |  | Change of Base Formula |  |
|  |
| No stationary points | Graphs of logarithms |
| Always positive |  |
| Always increasing |
| y-axis is HA |
| No VA |
| One-to-one |

|  |  |
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| Topic 1: Algebra | *Induction* |
| 1. Test | Let  | Ensure |
| 2. Assume | Assume true for  | Substitute for in statement |
| 3. Prove | Let | Substitute part of with  |
| 4. Explain | Since statement is true for , then it is also true for The proposition is true for and  |
| Topic 1: Algebra | *Complex Numbers* |
| There are two types of complex numbers |  |  |  |  |
| polar form | mod-arg form | Modulus (): The distance from the origin |  |
|  |  | Argument (): the angle is subtended from the real axis |  |
| Topic 1: Algebra | *Permutations and Combinations* |
| AND |  OR | EXCLUDING |
| Permutations (pick):To pick objects out of distinct objects is: |  | Combinations (choose):To choose objects out of distinct objects (order not important) is: |  |
| Topic 1: Algebra | *Sum and Product of Roots* |
| Formula of Quadratic: or  |
| For a quadratic equation: |  | For a polynomial: |  |
|  |  | Odd number: NegativeEven number: Positive |