SEKOLAH BUKIT SION
A LEVEL MATHEMATICS (9709)
PURE MATHEMATICS 1 (2019 – 2020)

SUMMARY OF TOPICS - SEMESTER 1

TERM 1

CHAPTER	NO. OF PERIODS
1. COORDINATES, POINTS AND LINES	
1.1. The Distance between Two Points	2
1.2. The Mid-Point of a Line Segment	
1.3. The Gradient of a Line Segment	
1.4. The Equation of a Straight Line and of a Curve	1
1.5. The Equation $ax + by + c = 0$	1
1.6. The Point of Intersection of Two Lines	1
1.7. The Gradient of Perpendicular Lines	1
CHAPTER TEST	**2 (8)**
2. SURDS AND INDICES	
2.1. Different kinds of number	
2.2. Surds and their properties	
2.3. Working with Indices	4
2.4. Zero and Negative Indices	
2.5. Fractional Indices	
CHAPTER TEST	**2 (6)**
3. FUNCTIONS AND GRAPHS	
3.1. The Idea of a Functions	2
3.2. Graphs, Domain and Range	
3.3. Graphs of Powers of x	2
3.4. The Modulus of a Number	
3.5. Graphs of the Form $y = ax^2 + bx + c$	2
3.6. The Shapes of Graphs of the Form $y = ax^2 + bx + c$	
3.7. The Point of Intersection of Two Graphs	4
3.8. Using Factors to Sketch Graphs	
3.9. Predicting Functions From Their Graphs	
CHAPTER TEST	**2 (12)**
4. QUADRATICS	
4.1. Quadratic Expressions	2
4.2. Completed Square Form	
4.3. Completing the Square	
4.4. Solving Quadratic Equation	2
4.5. The Discriminant $b^2 - 4ac$	
4.6. Simultaneous Equations	2
4.7. Equations Which Reduce to Quadratic Equations	
4.8. Finding Tangents to Quadratic Curves	
CHAPTER TEST	**2 (8)**

5. INEQUALITIES

5.1. Notation for Inequalities	2
5.2. Solving Linear Inequalities	2
5.3. Quadratic Inequalities	2
CHAPTER TEST	**2 (8)**

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TERM 2

CHAPTER	NO. OF PERIODS	
6. DIFFERENTIATION		
6.1. Calculating Gradients of Chords	2	
6.2. The Gradient of a Tangent to the Curve $y = x^2 + c$		
6.3. The Normal to a Curve at a Point		
6.4. The Gradient Formula for Quadratic Graphs	1	
6.5. Some Rules for Differentiation	1	
6.6. The Gradient Formula for Any Quadratic Graphs	1	
6.7. The Gradient Formula for Some Other Functions	1	
CHAPTER TEST	**1 (7)**	
7. APPLICATIONS OF DIFFERENTIATION		
7.1. Derivatives as Functions		
7.2. Increasing and Decreasing Functions	3	
7.3. Maximum and Minimum Points		
7.4. Derivatives as Rates of Change		
CHAPTER TEST	**1 (4)**	
8. SEQUENCES		
8.1. Constructing Sequences	1	
8.2. The Triangle Number Sequence	1	
8.3. The Factorial Sequence	1	
8.4. Pascal Sequence	1	
8.5. Arithmetic Sequences	2	
CHAPTER TEST	**2 (8)**	
9. THE BINOMIAL THEOREM		
9.1. Expanding $(x + y)^n$	1	
9.2. The Binomial Theorem	2	
CHAPTER TEST	**2 (5)**	
10. TRIGONOMETRY		
10.1. The Graph of $\cos\theta^\circ$	1	
10.2. The Graph of $\sin\theta^\circ$ and $\tan\theta^\circ$	1	
10.3. Exact values of Some Trigonometric Functions	2	
10.4. Symmetry Properties of the Graphs of $\cos\theta^\circ$, $\sin\theta^\circ$ and $\tan\theta^\circ$	3	
10.5. Solving Equations Involving the Trigonometric Functions	3	
10.6. Relations Between the Trigonometric Functions	3	
CHAPTER TEST	**2 (15)**	
REVISION FOR SEMESTER EXAMINATION	**6**	**(45)**

SUMMARY OF TOPICS – SEMESTER 2

TERM 3

CHAPTER	NO. OF PERIODS
11. COMBINING AND INVERTING FUNCTIONS	
11.1. Function Notation	1
11.2. Forming Composite Functions	1
11.3. Domain and Range	1
11.4. Sequences as Functions	1
11.5. Reversing Functions	1
11.6. One-one Functions	1
11.7. Finding Inverse Functions	1
11.8. Graphing Inverse Functions	1
CHAPTER TEST	**2 (10)**
12. EXTENDING DIFFERENTIATION	
12.1. Differentiating $(ax + b)^n$	1
12.2. The Chain Rule: an Informal Treatment	1
12.3. Related Rates of Change	1
12.4. Deriving the Chain Rule	1
CHAPTER TEST	**2 (6)**
13. VECTORS	
13.1. Translation of a Plane	2
13.2. Vector Algebra	
13.3. Basic Unit Vectors	
13.4. Position Vectors	2
13.5. Algebra with Position Vectors	
13.6. Vectors in Three Dimensions	
13.7. The Magnitude of a Vector	1
13.8. Scalar Products	1
13.9. Scalar Products in Component Form	1
13.10. The Distributive Rule $(\mathbf{p} + \mathbf{q}) \cdot \mathbf{r} = \mathbf{p} \cdot \mathbf{r} + \mathbf{q} \cdot \mathbf{r}$	1
CHAPTER TEST	**2 (10)**
14. GEOMETRIC SEQUENCES	
14.1. Geometric Sequences	3
14.2. Summing Geometric Series	
14.3. Convergent Sequences	3
14.4. Exponential Growth and Decay	
CHAPTER TEST	**2 (8)**

15. SECOND DERIVATIVES

15.1. Interpreting and Sketching Graphs	2
15.2. Second Derivatives in Practice	
15.3. Minima and Maxima Revisited	
15.4. Logical Distinctions	2
15.5. Extending $\frac{dy}{dx}$ notation	
15.6. Higher Derivatives	
CHAPTER TEST	**2 (6)**
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TERM 4

CHAPTER	NO. OF PERIODS	
16. INTEGRATION		
16.1. Finding a Function from its Derivative	1	
16.2. Calculating Areas	1	
16.3. The Area Algorithm	1	
16.4. Some Properties of Definite Integrals	1	
16.5. Infinite and Improper Integrals	1	
16.6. The Area Between Two Graphs	1	
16.7. Integrating $(ax + b)^n$	1	
CHAPTER TEST	**2 (9)**	
17. VOLUME OF REVOLUTION		
17.1. Volumes of Revolution	2	
17.2. Volumes of Revolution about the y-axis	2	
CHAPTER TEST	**2 (6)**	
18. RADIANS		
18.1. Radians	1	
18.2. Length of Arc and Area of Sector	2	
18.3. Graphs of the Trigonometric Functions	2	
18.4. Inverse Trigonometric Functions	1	
18.5. Solving Trigonometric Equations using Radians	2	
CHAPTER TEST	**2 (10)**	
REVISION FOR FINAL EXAMINATION	**5**	**(30)**