

Immanuel Lutheran College

S.3 Mathematics Course Outline (2010 – 2011)

Textbook: New Trend Mathematics (Second Ed.: School- based Curriculum) 3A, 3B (Chung Tai)

<i>Date</i>	<i>Chapter</i>	<i>Topics</i>	No. of periods	Test / Exam
2/9/10 – 17/9/10	1	<i>Laws of Indices</i>	14	UT 1
20/9/10 – 5/10/10	2	More about factorization	11	27/11/11 – 1/11/11
Quiz 1				
6/10/10 – 22/10/10	7	<i>More About Percentage</i>	15	
2/11/10 – 11/11/10	10.1 to 10.2	Application of Trigonometry I	9	
2/11/10 – 12/11/10	3	Study of 3-dimensional Figures	14	
Quiz 2				
15/11/10 – 30/11/10	6	<i>Introduction to Probability</i>	9	
1/12/10 – 17/12/10	4.1 – 4.2	<i>Mensuration I</i>	8	
First Examination: Paper 1: Setter – LAM PK - 90 minutes Paper 2: Setter – SO WS - 30 minutes Ch. 1-3, 4.1 – 4.2, 6, 7, 10. 1 - 10.2				
21/1/11 – 28/1/11	4.3 – 4.5	<i>Mensuration II</i>	8	UT2
10/2/11 – 22/2/11	10.3-10.5	<i>Application of Trigonometry II</i>	8	29/3/11 – 1/04/11
Quiz 3				
23/2/11 – 3/3/11	5	<i>Theorems related to Triangles</i>	8	
4/3/11 – 25/3/11	8	<i>Properties of Quadrilaterals</i>	16	TSA mock tests
4/4/11 – 3/5/11	9	<i>Coordinate Geometry</i>	14	
4/5/11 – 18/5/11	11	<i>Use and Misuse of Statistics</i>	11	
Quiz 4				
19/5/11 – 30/5/11			7	
31/5/11 – 8/6/11		<i>Revision period and TSA</i>	7	
First Examination: Paper 1: Setter – SO WS - 90 minutes Paper 2: Setter – LAM PK - 30 minutes Ch. 1 - 11				

Chapter 0 The Art of Mathematical Thinking (3)

Teaching Objective

- To know the steps of solving problems.
- To know the different strategies for solving problems: act it out, trial and error, look for a pattern, simplify the problem, draw a diagram, work backwards, use equations, draw a table, eliminate possibilities.

Teaching Schedule

Objective	Contents	Cycle/ Date	Suggested Teaching Period	Exercise	Remarks
<ul style="list-style-type: none"> • To stimulate learning motivation. • To revise the steps in problem solving and the thinking skills learned. Meanwhile, students are encouraged to face problems positively. • To learn different problem-solving strategies through various examples. 	Title page 0.1 Review 0.2 Problem-solving Strategies A. Act it out B. Trial and error C. Look for a pattern D. Simplify the problem E. Draw a diagram F. Work backwards G. Use equations H. Draw a table I. Eliminate possibilities			Exercise 0 (page 0.11)	Class Activity 0.1 (page 0.3)

Note : The Suggested Teaching Period is estimated on the basis that there are 40 minutes in each period. Teachers may adjust the teaching periods to fit their own teaching progress.

Chapter 1 Laws of Integral Indices

Teaching Objective

- To understand the meanings of zero and negative indices.
- To make use of laws of integral indices to simplify algebraic expressions.
- To understand the meaning of scientific notation.
- To solve practical problems by using scientific notations.
- To understand different numeral systems.
- To build up the concept of place holder.
- To convert denary numbers into binary/hexadecimal numbers or vice versa.

Teaching Suggestion

- Prior to the introduction of the laws of integral indices, teachers may provide students with activities for exploring the rules of indices. Students may have difficulties in understanding the rules involved and make a lot of mistakes when using the rules together. For example,
 - (a) confusion about the distributive rule such as $m^3 n^2 = (mn)^5$, $(a + b)^2 = a^2 + b^2$
 - (b) unable to determine the order of operations such as $3 \times 4^6 = 12^6$, $6^4 \div 3^2 = 2^2$
 - (c) confusion about addition or multiplication such as $(x^3)^2 = x^5$, $3a \cdot 2a = 5a$
 - (d) neglect the letters when performing operations such as $4 + 3n = 7n$, $5 \cdot 2^x = 10^x$
 Discussion may be made to clarify the misconceptions of students.
- It is not necessary to ask students to go into complicated operations of algebraic symbols. However, students should have sufficient ability to solve problems involving equations.

Teaching Schedule

Objective	Contents	Cycle/ Date	Suggested Teaching Period	Exercise	Remarks
<ul style="list-style-type: none"> To stimulate learning motivation. To do a revision on the basic knowledge and techniques required for this chapter. 	Title page, Preview				Refer to <i>Hint for the Title Page Question</i> (page 1.43)

Objective	Contents	Cycle/ Date	Suggested Teaching Period	Exercise	Remarks
<ul style="list-style-type: none"> To do a revision on the concepts of positive integral indices and the related terms. To do a revision on the laws of positive integral indices, including: <ul style="list-style-type: none"> (a) $a^m \times a^n = a^{m+n}$, $a^m \div a^n = a^{m-n}$ (b) $(a^m)^n = a^{mn}$, $(ab)^n = a^n b^n$ To learn the law of $(\frac{a}{b})^n = \frac{a^n}{b^n}$. Involving the basic competencies under codes <i>KS3-NA10-1</i> and <i>KS3-NA10-2</i>. To explore the meanings and laws of zero and negative integral indices. Involving the basic competencies under codes <i>KS3-NA10-1</i> and <i>KS3-NA10-2</i>. To know the meaning of scientific notation. To learn how to express numbers with many digits in scientific notation and their operations. Involving the basic competencies under codes <i>KS3-NA3-2</i> and <i>KS3-NA3-3</i>. To know the denary, binary and hexadecimal systems and the concepts of place value. To learn the conversion of denary numbers into binary / hexadecimal numbers and vice versa. 	<p>1.1 Laws of Positive Integral Indices</p> <p>A. Concept of index</p> <p>B. Laws of indices of $a^m \times a^n$ and $a^m \div a^n$</p> <p>C. Laws of indices of $(a^m)^n$ and $(ab)^n$</p> <p>D. Law of index of $(\frac{a}{b})^n$</p> <p>1.2 Laws of Zero and Negative Integral Indices</p> <p>1.3 Scientific Notation</p> <p>1.4 Indices and Numeral Systems</p> <p>A. Denary system</p> <p>B. Binary system</p>		2	Exercise 1A (page 1.10)	Class Activity 1.1 (page 1.7) I.T. tool (page 1.5, 1.7)
			6	Exercise 1B (page 1.16)	Class Activity 1.2 (page 1.11)
			2	Exercise 1C (page 1.23)	Class Activity 1.3 (page 1.17) I.T. tool (page 1.19)
			2	Exercise 1D (page 1.30) Exercise 1E (page 1.35)	I.T. tool (page 1.27, 1.29, 1.32, 1.34)

Objective	Contents	Cycle/ Date	Suggested Teaching Period	Exercise	Remarks
<ul style="list-style-type: none"> To remind students the essential knowledge acquired in the chapter. 	C. Hexadecimal system Chapter Summary		1	Check Yourself (page 1.37) Revision Exercise 1 (page 1.39)	

Note : *The Suggested Teaching Period is estimated on the basis that there are 40 minutes in each period. Teachers may adjust the teaching periods to fit their own teaching progress.*

Chapter 2 More about Factorization

Teaching Objective

- To use cross-method for factorization.
- To use identities of the sum and difference of two cubes for factorization.

Teaching Suggestion

- Since all factors of the constant terms and the coefficients of the terms with degree two are required to be listed out under cross-method, students should be familiar with this skill prior to the introduction of cross-method. For less able students, teachers may provide them with relevant exercises to strengthen the skill.

Teaching Schedule

Objective	Contents	Cycle/ Date	Suggested Teaching Period	Exercise	Remarks
<ul style="list-style-type: none"> To stimulate learning motivation. To do a revision on the basic knowledge and techniques required for this chapter. 	Title page, Preview				Refer to <i>Hint for the Title Page Question</i> (page 2.20)
<ul style="list-style-type: none"> To learn how to factorize quadratic polynomials in one variable by cross-method. Involving the basic competency under code <i>KS3-NA11-4</i>. 	2.1 Factorization of Quadratic Polynomials in One Variable A. Factorization of polynomials in the form of $x^2 + bx + c$ B. Factorization of polynomials in the form of $ax^2 + bx + c$		3.5	Exercise 2A (page 2.7) Exercise 2B (page 2.11)	Class Activity 2.1 (page 2.3) Class Activity 2.2 (page 2.8) I.T. tool (page 2.9)
<ul style="list-style-type: none"> To extend the concepts and skills of factorization of quadratic polynomials in one variable to the factorization of quadratic polynomials in two variables. 	2.2 Factorization of Quadratic Polynomials in Two Variables		2.5	Exercise 2C (page 2.13)	
<ul style="list-style-type: none"> To factorize polynomials using $x^3 - y^3 \equiv (x - y)(x^2 + xy + y^2)$ 	2.3 Sum and Difference of Two		1	Exercise 2D	Class Activity 2.3

Objective	Contents	Cycle/ Date	Suggested Teaching Period	Exercise	Remarks
<p>and $x^3 + y^3 \equiv (x + y)(x^2 - xy + y^2)$.</p> <ul style="list-style-type: none"> To remind students the essential knowledge acquired in the chapter. 	<p>Cubes</p> <p>Chapter Summary</p>		2	<p>(page 2.16)</p> <p>Check Yourself (page 2.17) Revision Exercise 2 (page 2.18)</p>	(page 2.14)

Note : The Suggested Teaching Period is estimated on the basis that there are 40 minutes in each period. Teachers may adjust the teaching periods to fit their own teaching progress.

Chapter 3 Study of 3-dimensional Figures

Teaching Objective

- To master the skills in 2-D representation of a solid, and draw any solid based on given 2-D representations from various views.
- To explore the properties of lines and planes of a solid, including:
 - (a) the projections of points and lines onto a plane;
 - (b) a line perpendicular to a plane;
 - (c) the angle between a line and a plane;
 - (d) the angle between two planes.
- To recognize the property of symmetry for solids and appreciate solids with the properties of the reflectional and rotational symmetry.
- To explore and identify nets of solids.

Teaching Suggestion

- Spatial sense is one of the abilities advocated in the mathematics curriculum. Through different exploration activities in this chapter, including investigation of the symmetry of solids, observation of solids from different directions and exploration of the nets of solids, the abilities of students to visualize and explore 2-dimensional and 3-dimensional figures are to be strengthened.
- When drawing the plane figures of solids, students should be able to master the techniques but they are not required to strictly adhere to the drawing rules.
- This chapter emphasizes the concept about the relation between lines and planes in 3-dimensional space, without involving calculations. This concept is essential for studying trigonometry in 3-dimensional space in senior secondary levels.

Teaching Schedule

Objective	Contents	Cycle/ Date	Suggested Teaching Period	Exercise	Remarks
<ul style="list-style-type: none"> To stimulate learning motivation. To do a revision on the basic knowledge and techniques required for this chapter. 	Title page, Preview				Refer to <i>Hint for the Title Page Question</i> (page 3.41)
<ul style="list-style-type: none"> To learn orthographic projection. To recognize the limitation of 2-D representations in 	3.1 Projections of 3-dimensional Figures		2	Exercise 3A (page 3.12)	Class Activity 3.1 (page 3.10)

Objective	Contents	Cycle/ Date	Suggested Teaching Period	Exercise	Remarks
<ul style="list-style-type: none"> identifying the solid. Involving the basic competency under code <i>KS3-MS8-4</i>. To explore the properties of simple solids, including: <ul style="list-style-type: none"> (a) the projections of points and lines onto a plane; (b) a line perpendicular to a plane; (c) the angle between a line and a plane; (d) the angle between two planes. Involving the basic competency under code <i>KS3-MS8-5</i>. 	A. Orthographic projections B. Limitations of plane figures 3.2 Properties of Lines and Planes of Solids A. Projections of points and lines onto a plane B. Lines perpendicular to a plane C. Angle between a line and a plane D. Angle between two planes		1	Exercise 3B (page 3.19)	
<ul style="list-style-type: none"> To recognize and appreciate the reflectional and rotational symmetries in a solid. Involving the basic competencies under codes <i>KS3-MS8-1</i> and <i>KS3-MS8-2</i>. 	3.3 Symmetry of Solids A. Reflectional symmetry B. Rotational symmetry		2		Class Activity 3.2 (page 3.22) Class Activity 3.3 (page 3.24) I.T. tool (page 3.25)
<ul style="list-style-type: none"> To explore and determine the nets of solids. Involving the basic competency under code <i>KS3-MS8-3</i>. 	3.4 Nets of Solids		2	Exercise 3C (page 3.29)	Class Activity 3.4 (page 3.27)
<ul style="list-style-type: none"> To remind students the essential knowledge acquired in the chapter. 	Chapter Summary		1	Check Yourself (page 3.33) Revision Exercise 3 (page 3.34)	

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Chapter 4 Mensuration

Teaching Objective

- To understand and use formulae to find the volumes and surface areas of pyramids, circular cones and spheres.
- To identify the formulae for the length, area and volume.
- To understand and apply the relation among sides, surface areas and volumes of similar solids.

Teaching Suggestion

- To enhance students' understanding of the formulae for volumes and surface areas of solids learned in this chapter, teachers may use simple models, I.T. tools or experiments to explore the formulae with students. For abler students, teachers may mention the limitation of using the above methods and point out that the formulae are in fact derived from more advanced mathematical knowledge.
- After learning the mensuration formulae for figures / solids, teachers may guide students to compare and identify the dimensions of perimeter, area and volume, i.e. perimeter is a linear measurement: e.g. $2(a + b)$, 4ℓ , $2\pi r$
area is a two-dimensional measurement: e.g. $a \times b$, a^2 , πr^2 , $\frac{1}{2}(a + b)h$
volume is a three-dimensional measurement: e.g. $a \times b \times c$, $\frac{4}{3}\pi r^3$, $\pi r^2 h$, $\frac{1}{3}\pi r^2 h$
- To guide students through the relations between the ratios of the corresponding sides, areas and volumes of similar solids. For abler students, teachers may verify the relations with different pairs of similar solids like pyramids, circular cones, prisms, cylinders and spheres.

Teaching Schedule

Objective	Contents	Cycle/ Date	Suggested Teaching Period	Exercise	Remarks
<ul style="list-style-type: none"> To stimulate learning motivation. To do a revision on the basic knowledge and techniques required for this chapter. To understand and use the formulae for the volumes of a pyramid and a frustum. 	Title page, Preview 4.1 Volumes and Surface Areas of Pyramids		3	Exercise 4A (page 4.11)	Refer to <i>Hint for the Title Page Question</i> (page 4.49) Class Activity 4.1 (page 4.5)

Objective	Contents	Cycle/ Date	Suggested Teaching Period	Exercise	Remarks
<ul style="list-style-type: none"> To understand and use the formula for the surface area of a pyramid. Involving the basic competencies under codes <i>KS3-MS3-3</i> and <i>KS3-MS3-4</i>. To understand and use the formula for the volume of a cone. To understand and use the formula for the curved surface area of a right circular cone. Involving the basic competencies under codes <i>KS3-MS3-3</i> and <i>KS3-MS3-4</i>. 	<p>A. Pyramids and right pyramids B. Volumes of pyramids C. Volumes of frustums D. Surface areas of pyramids</p> <p>4.2 Volumes and Surface Areas of Circular Cones</p> <p>A. Circular cones and right circular cones B. Volumes of circular cones C. Curved surface areas of right circular cones</p>		3	Exercise 4B (page 4.21)	I.T. tool (page 4.5)
<ul style="list-style-type: none"> To understand and use the formula for the volume of a sphere. To understand and use the formula for the surface area of a sphere. Involving the basic competencies under codes <i>KS3-MS3-3</i> and <i>KS3-MS3-4</i>. 	<p>4.3 Volumes and Surface Areas of Spheres</p> <p>A. Volumes of spheres B. Surface areas of spheres</p>		3	Exercise 4C (page 4.28)	Class Activity 4.2 (page 4.24)
<ul style="list-style-type: none"> To do a revision on the mensuration formulae for some basic figures / solids. To let students identify the dimensions of perimeter, area and volume and understand that perimeter, area and volume are linear measurement, two-dimensional measurement and three-dimensional measurement respectively. Involving the basic competency under code <i>KS3-MS3-6</i>. 	<p>4.4 Mensuration Formulae</p> <p>A. Plane figures B. Solids</p>		3		
<ul style="list-style-type: none"> To understand the relations between the ratio of corresponding sides, the ratio of corresponding areas and the ratio of corresponding volumes of similar solids. 	<p>4.5 Similar Solids</p>		3	Exercise 4D (page 4.39)	Class Activity 4.3 (page 4.33)

Objective	Contents	Cycle/ Date	Suggested Teaching Period	Exercise	Remarks
<ul style="list-style-type: none"> Involving the basic competency under code KS3-MS3-5. To remind students the essential knowledge acquired in the chapter. 	Chapter Summary		3	Check Yourself (page 4.42) Revision Exercise 4 (page 4.44)	

Note : *The Suggested Teaching Period is estimated on the basis that there are 40 minutes in each period. Teachers may adjust the teaching periods to fit their own teaching progress.*

Chapter 5 Theorems Related to Triangles

Teaching Objective

- To identify the important lines in a triangle.
- To understand the relation between sides and angles of a triangle.
- To find the centres of triangles.

Teaching Suggestion

- Teachers may do a revision with students on the methods of drawing angle bisectors, perpendicular bisectors and perpendicular lines by construction before exploring the centres of triangles. Also, teachers may use I.T. tools to help in exploring the properties of the centres of triangles.

Teaching Schedule

Objective	Contents	Cycle/ Date	Suggested Teaching Period	Exercise	Remarks
<ul style="list-style-type: none"> To stimulate learning motivation. To do a revision on the basic knowledge and techniques required for this chapter. 	Title page, Preview				Refer to <i>Hint for the Title Page Question</i> (page 5.34)
<ul style="list-style-type: none"> To recognize the angle bisector, perpendicular bisector, altitude and median of a triangle. Involving the basic competency under code <i>KS3-MS9-3</i>. 	5.1 Important Lines in a Triangle		5	Exercise 5A (page 5.8)	I.T. tool (page 5.4)
<ul style="list-style-type: none"> To explore the properties of sides and angles of a triangle. Involving the basic competency under code <i>KS3-MS7-4</i>. 	5.2 Sides and Angles of a Triangle A. Triangles with equal base angles B. Relations between sides and angles		5	Exercise 5B (page 5.17)	Class Activity 5.1 (page 5.13) Class Activity 5.2 (page 5.15)

Objective	Contents	Cycle/ Date	Suggested Teaching Period	Exercise	Remarks
<ul style="list-style-type: none"> To explore and discuss the methods for finding the incentre, circumcentre, centroid and orthocentre of a triangle. 	<p>C. Triangle inequality</p> <p>5.3 Centres of a Triangle</p> <p>A. Incentre</p> <p>B. Circumcentre</p> <p>C. Centroid</p> <p>D. Orthocentre</p>		3		<p>Class Activity 5.3 (page 5.21)</p> <p>Class Activity 5.4 (page 5.22)</p> <p>Class Activity 5.5 (page 5.23)</p> <p>Class Activity 5.6 (page 5.24)</p> <p>I.T. tool (page 5.21, 5.22, 5.23, 5.24)</p>
<ul style="list-style-type: none"> To remind students the essential knowledge acquired in the chapter. 	Chapter Summary		2	<p>Check Yourself (page 5.27)</p> <p>Revision Exercise 5 (page 5.28)</p>	<p>I.T. Corner (page 5.35)</p> <p>Appreciating Mathematics - Centres of a Triangle (page 5.42)</p> <p>I.T. tool (page 5.42)</p>

Note : The Suggested Teaching Period is estimated on the basis that there are 40 minutes in each period. Teachers may adjust the teaching periods to fit their own teaching progress.

Chapter 6 Introduction to Probability

Teaching Objective

- To understand the meaning of probability.
- To develop an intuitive understanding of the relation between probability and relative frequency.
- To compare theoretical probability and experimental probability.
- To find theoretical probability by listing sample spaces and counting.
- To investigate questions related to probability in real life (including geometric probability).
- To know the meaning and applications of the expected value.

Teaching Suggestion

- Teachers may use examples of daily-life activities to investigate probability. During the discussion about the chances of the occurrence of these activities, students can understand the meaning of probability by intuition.
- Apart from using real objects, teachers may also simulate a large number of trials of experiments through computers or calculators.
- Teachers may ask students to find the probability by listing the possible outcomes or using simple counting techniques. Finding the probability by addition rule and multiplication rule will be introduced in senior forms.

Teaching Schedule

Objective	Contents	Cycle/ Date	Suggested Teaching Period	Exercise	Remarks
<ul style="list-style-type: none"> • To stimulate learning motivation. • To do a revision on the basic knowledge and techniques required for this chapter. 	Title page, Preview				Refer to <i>Hint for the Title Page Question</i> (page 6.47)
<ul style="list-style-type: none"> • To introduce the concept and definition of probability intuitively. 	6.1 Meaning of Probability A. Chances of events		3	Exercise 6A (page 6.10)	

Objective	Contents	Cycle/ Date	Suggested Teaching Period	Exercise	Remarks
<ul style="list-style-type: none"> Involving the basic competency under code <i>KS3-DH4-2</i>. 	happening B. Possible outcomes C. Probability D. Certain events and impossible events				
<ul style="list-style-type: none"> To learn experimental probability. To compare experimental probability with theoretical probability. Involving the basic competency under code <i>KS3-DH4-1</i>. 	6.2 Relative Frequency and Experimental Probability A. Relative frequency B. Experimental probability		2	Exercise 6B (page 6.18)	Class Activity 6.1 (page 6.14) I.T. tool (page 6.15)
<ul style="list-style-type: none"> To find the probability by listing the sample space and counting. Involving the basic competency under code <i>KS3-DH4-2</i>. 	6.3 Sample Spaces and Counting		3	Exercise 6C (page 6.26)	Class Activity 6.2 (page 6.21)
<ul style="list-style-type: none"> To understand the meaning of geometric probability. To understand the meaning of expected value. 	6.4 Other Problems in Probability A. Geometric probability B. Expected value		3	Exercise 6D (page 6.36)	Class Activity 6.3 (page 6.32)
<ul style="list-style-type: none"> To remind students the essential knowledge acquired in the chapter. 	Chapter Summary		1	Check Yourself (page 6.40) Revision Exercise 6 (page 6.41)	

Note : The Suggested Teaching Period is estimated on the basis that there are 40 minutes in each period. Teachers may adjust the teaching periods to fit their own teaching progress.

Chapter 7 More about Percentages

Teaching Objective

- To apply percentages to solve practical problems involving multiple percentage changes and percentage changes in different parts, etc.
- To apply percentages to solve problems involving growth, decay, simple interest, compound interest, etc.
- To apply percentages to solve simple daily problems including rates and taxation.

Teaching Suggestion

- The contents in relation to percentage change in Section 7.1A may help students to revise what they have learnt before.
- Multiple percentage changes and percentage changes in different parts are more in-depth applications of percentage for students. The analyses with diagrams may help students understand the problems more easily.
- Although simple interest and compound interest are applications of percentage changes without involving new mathematical concepts, their relevant formulae can help improve the computational efficiency and thus teachers should encourage students to memorize them.
- When introducing salaries tax, teachers may go through calculations of tax charged at ‘progressive rates’ and ‘standard rate’ together. As for the tax rates, since they may not be the same for different fiscal years, it is not necessary for students to memorize them.

Teaching Schedule

Objective	Contents	Cycle/ Date	Suggested Teaching Period	Exercise	Remarks
<ul style="list-style-type: none"> • To stimulate learning motivation. • To do a revision on the basic knowledge and techniques required for this chapter. • To learn and understand various forms of percentage changes. 	Title page, Preview 7.1 Various Forms of Percentage Changes A. Percentage change B. Multiple percentage changes		2	Exercise 7A (page 7.11)	Refer to <i>Hint for the Title Page Question</i> (page 7.43)

Objective	Contents	Cycle/ Date	Suggested Teaching Period	Exercise	Remarks
<ul style="list-style-type: none"> To solve problems involving growth and decay.. Involving the basic competency under code <i>KS3-NA5-4</i>. To solve problems involving simple interest. Involving the basic competency under code <i>KS3-NA5-2</i>. To solve problems involving compound interest. Involving the basic competency under code <i>KS3-NA5-3</i>. To apply percentages to solve problems on rates and taxations. To remind students the essential knowledge acquired in the chapter. 	<p>C Percentage changes in different parts</p> <p>7.2 Growth and Decay</p> <p>A. Growth</p> <p>B. Decay</p> <p>7.3 Simple Interest</p> <p>7.4 Compound Interest</p> <p>7.5 Rates and Taxations</p> <p>A. Rates</p> <p>B. Property tax</p> <p>C. Salaries tax</p> <p>Chapter Summary</p>		<p>2</p> <p>2</p> <p>4</p> <p>1</p> <p>2</p>	<p>Exercise 7B (page 7.18)</p> <p>Exercise 7C (page 7.23)</p> <p>Exercise 7D (page 7.29)</p> <p>Exercise 7E (page 7.36)</p> <p>Check Yourself (page 7.38) Revision Exercise 7 (page 7.40)</p>	<p>Class Activity 7.1 (page 7.25) I.T. tool (page 7.26)</p>

Note : The Suggested Teaching Period is estimated on the basis that there are 40 minutes in each period. Teachers may adjust the teaching periods to fit their own teaching progress.

Chapter 8 Properties of Quadrilaterals

Teaching Objective

- To know and understand the properties of different quadrilaterals.
- To prove the properties of different quadrilaterals by deduction.
- To perform simple proofs related to parallelograms.
- To understand and use the mid-point theorem and intercept theorem.

Teaching Suggestion

- At the beginning of this chapter, the properties of different quadrilaterals are introduced. When students are acquainted with these properties, teachers can prove the properties by deduction.
- Teachers may make use of the I.T. tool or guide students to draw the figures in order to strengthen the ideas of students on the properties of different quadrilaterals.

Teaching Schedule

Objective	Contents	Cycle/ Date	Suggested Teaching Period	Exercise	Remarks
<ul style="list-style-type: none"> • To stimulate learning motivation. • To do a revision on the basic knowledge and techniques required for this chapter. 	Title page, Preview				Refer to <i>Hint for the Title Page Question</i> (page 8.51)
<ul style="list-style-type: none"> • To recognize the properties of quadrilaterals and perform calculations through these properties. • To understand the classification of quadrilaterals. • Involving the basic competency under code <i>KS3-MS11-1</i>. 	8.1 Investigation of Quadrilaterals A. Common quadrilaterals B. Kites C. Trapeziums D. Parallelograms		4	Exercise 8A (page 8.11) Exercise 8B (page 8.17)	Class Activity 8.1 (page 8.5) Class Activity 8.2 (page 8.7) I.T. tool (page 8.5, 8.6, 8.8, 8.13, 8.14, 8.15)

Objective	Contents	Cycle/ Date	Suggested Teaching Period	Exercise	Remarks
<ul style="list-style-type: none"> • To deduce the properties of quadrilaterals. • To perform proofs involving the properties of quadrilaterals. • To understand the conditions for determining parallelograms. 	<p>E. Rectangles F. Squares G. Rhombuses H. Classification of quadrilaterals</p> <p>8.2 Proofs related to Quadrilaterals</p> <p>A. Properties of kites B. Properties of trapeziums C. Properties of parallelograms D. Conditions for determining parallelograms E. Properties of rhombuses F. Property of rectangles G. Properties of squares</p>		6	Exercise 8C (page 8.28)	Class Activity 8.3 (page 8.22) I.T. tool (page 8.23)
<ul style="list-style-type: none"> • To understand and apply the mid-point theorem. 	8.3 Mid-point Theorem		1.5	Exercise 8D (page 8.33)	I.T. tool (page 8.31)
<ul style="list-style-type: none"> • To understand and apply the intercept theorem. 	8.4 Intercept Theorem		1.5	Exercise 8E (page 8.38)	
<ul style="list-style-type: none"> • To remind students the essential knowledge acquired in the chapter. 	Chapter Summary		2	Check Yourself (page 8.43) Revision Exercise 8 (page 8.44)	Appreciating Mathematics - The Birth of Deductive Geometry (page 8.53)

Note : The Suggested Teaching Period is estimated on the basis that there are 40 minutes in each period. Teachers may adjust the teaching periods to fit their own teaching progress.

Chapter 9 Coordinate Geometry

Teaching Objective

- To understand and use the distance formula and slope formula.
- To understand the conditions of parallel lines and perpendicular lines.
- To use the mid-point formula to find the coordinates of the mid-point.
- To use the section formula to find the coordinates of the internal point of division.
- To appreciate the use of analytical geometry as an alternative approach to deductive geometry in the proofs for the properties related to rectilinear figures.

Teaching Suggestion

- To guide students to understand the method of finding the distance between two points and then to deduce the formula $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$. Teachers may point out that this formula is equivalent to $d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$. For the slope of a line segment joining two points, the slope of a straight line may be interpreted as the ratio of the opposite side to the adjacent side. Teachers may also point out the relation between the slope and the direction and degree of steepness (positive, negative or zero). The conditions for parallel and perpendicular lines should be illustrated by an intuitive approach, instead of deduction from the ratio of tangent.
- Teachers may point out that there are different ways to learn geometry such as experimental approach, deductive approach and analytical approach. Whilst experimental approach is not stringent enough and there are no general rules to deal with geometric problems under deductive approach, analytical geometry interprets geometric problems by using coordinates which involves purely mechanical algebraic operations. To let students appreciate the strengths of analytical geometry and enhance their abilities in geometric proofs, teachers may use coordinates of mid-points and slopes of straight lines to prove the mid-point formula.

Teaching Schedule

Objective	Contents	Cycle/ Date	Suggested Teaching Period	Exercise	Remarks
<ul style="list-style-type: none"> • To stimulate learning motivation. • To do a revision on the basic knowledge and techniques required for this chapter. 	Title page, Preview				Refer to Hint for the Title Page Question (page 9.45)

Objective	Contents	Cycle/ Date	Suggested Teaching Period	Exercise	Remarks
<ul style="list-style-type: none"> To illustrate that analytical geometry can be applied to geometric proofs. 	9.1 Introduction		0.5		
<ul style="list-style-type: none"> To understand and apply the distance formula. Involving the basic competency under code <i>KS3-MS/3-1</i>. 	9.2 Distance between Two Points		0.5	Exercise 9A (page 9.6)	Class Activity 9.1 (page 9.3)
<ul style="list-style-type: none"> To understand the slope of a line segment. To understand what the positive/negative sign and the magnitude of a slope mean in coordinate geometry. To apply the concept of slope to solve plane geometric problems. Involving the basic competency under code <i>KS3-MS/3-2</i>. 	9.3 Slope		2	Exercise 9B (page 9.12)	I.T. tool (page 9.8)
<ul style="list-style-type: none"> To realize that the slopes of two parallel lines are the same. Involving the basic competency under code <i>KS3-MS/3-4</i>. 	9.4 Parallel Lines		2	Exercise 9C (page 9.16)	Class Activity 9.2 (page 9.13) I.T. tool (page 9.14)
<ul style="list-style-type: none"> To understand that the product of the slopes of two perpendicular lines is -1. Involving the basic competency under code <i>KS3-MS/3-4</i>. 	9.5 Perpendicular Lines		2	Exercise 9D (page 9.21)	Class Activity 9.3 (page 9.17) I.T. tool (page 9.19)
<ul style="list-style-type: none"> To understand and apply the mid-point formula. To understand and apply the section formula. Involving the basic competency under code <i>KS3-MS/3-3</i>. 	9.6 Point of Division A. Mid-point B. Internal point of division		2	Exercise 9E (page 9.30)	Class Activity 9.4 (page 9.23) Class Activity 9.5 (page 9.25)
<ul style="list-style-type: none"> To know and appreciate that, apart from using deductive approach, geometric problems can also be proved by analytical approach. 	9.7 Use of Coordinates in Plane Figures		2	Exercise 9F (page 9.36)	Class Activity 9.6 (page 9.32) I.T. tool (page 9.33)
<ul style="list-style-type: none"> To remind students the essential knowledge acquired in the 	Chapter Summary		1	Check Yourself	

Objective	Contents	Cycle/ Date	Suggested Teaching Period	Exercise	Remarks
chapter.				(page 39) Revision Exercise 9 (page 9.41)	

12

Note : The Suggested Teaching Period is estimated on the basis that there are 40 minutes in each period. Teachers may adjust the teaching periods to fit their own teaching progress.

Chapter 10 Applications of Trigonometry

Teaching Objective

- To know the exact values of trigonometric ratios of special angles 30° , 45° and 60°
- To know the properties and relations of trigonometric ratios.
- To apply trigonometry to solve problems related to gradient, angle of elevation, angle of depression and bearings.

Teaching Suggestion

- Teachers may let students observe the following properties and relations of trigonometric ratios through exploratory activities:

$$\tan \theta = \frac{\sin \theta}{\cos \theta}, \sin^2 \theta + \cos^2 \theta = 1, \cos(90^\circ - \theta) = \sin \theta, \sin(90^\circ - \theta) = \cos \theta, \tan(90^\circ - \theta) = \frac{1}{\tan \theta}$$

- To motivate students to explore and deduce trigonometric identities, teachers may show them the values of trigonometric ratios of angles and the corresponding right-angled triangles with calculators and graphical software.
- If students have learned bearings and gradient from other subjects (e.g. Geography), teachers are not necessary to repeat their meanings.

Teaching Schedule

Objective	Contents	Cycle/ Date	Suggested Teaching Period	Exercise	Remarks
<ul style="list-style-type: none"> To stimulate learning motivation. To do a revision on the basic knowledge and techniques 	Title page, Preview				Refer to <i>Hint for the Title Page Question</i> (page 10.59)

Objective	Contents	Cycle/ Date	Suggested Teaching Period	Exercise	Remarks
<p>required for this chapter.</p> <ul style="list-style-type: none"> To explore the trigonometric ratios of special angles 30°, 45° and 60°. To understand and use the following identities: $\tan \theta = \frac{\sin \theta}{\cos \theta}, \sin^2 \theta + \cos^2 \theta = 1, \cos(90^\circ - \theta) = \sin \theta,$ $\sin(90^\circ - \theta) = \cos \theta, \tan(90^\circ - \theta) = \frac{1}{\tan \theta}$ 	<p>10.1 Trigonometric Ratios of Special Angles</p> <p>10.2 Trigonometric Relations</p> <p>A. Relation among quotients of trigonometric ratios</p> <p>B. Relation among the squares of trigonometric ratios</p> <p>C. Trigonometric ratios of complementary angles</p> <p>D. Trigonometric identities</p>		<p>4</p> <p>3</p>	<p>Exercise 10A (page 10.8)</p> <p>Exercise 10B (page 10.15)</p> <p>Exercise 10C (page 10.23)</p>	<p>Class Activity 10.1 (page 10.3)</p> <p>Class Activity 10.2 (page 10.10)</p> <p>Class Activity 10.3 (page 10.12)</p> <p>Class Activity 10.4 (page 10.17)</p> <p>Class Activity 10.5 (page 10.18)</p> <p>Class Activity 10.6 (page 10.21)</p> <p>I.T. tool (page 10.10, 10.12, 10.18)</p>
<ul style="list-style-type: none"> To apply trigonometry to solve problems related to gradient. Involving the basic competency under code <i>KS3-MS/4-3</i>. To apply trigonometry to solve problems related to angles of elevation and depression. Involving the basic competency under code <i>KS3-MS/4-3</i>. To apply trigonometry to solve problems related to bearings. Involving the basic competency under code <i>KS3-MS/4-3</i>. 	<p>10.3 Gradients</p> <p>A. Gradient of a road</p> <p>B. Gradient on a map</p> <p>10.4 Angles of Elevation and Depression</p> <p>10.5 Bearings</p> <p>A. Compass bearing</p> <p>B. True bearing</p> <p>C. Trigonometric problems involving bearings</p>		<p>1</p> <p>1</p> <p>1</p>	<p>Exercise 10D (page 10.29)</p> <p>Exercise 10E (page 10.35)</p> <p>Exercise 10F (page 10.43)</p> <p>Exercise 10G (page 10.47)</p>	

Objective	Contents	Cycle/ Date	Suggested Teaching Period	Exercise	Remarks
<ul style="list-style-type: none"> To remind students the essential knowledge acquired in the chapter. 	Chapter Summary		2	Check Yourself (page 10.51) Revision Exercise 10 (page 10.52)	

12

Note : The Suggested Teaching Period is estimated on the basis that there are 40 minutes in each period. Teachers may adjust the teaching periods to fit their own teaching progress.

Chapter 11 Use and Misuse of Statistics

Teaching Objective

- To identify the misleading elements in diagrams and accompanying statements, and recognize the dangers of misinterpreting statistical data.
- To explore and deduce the impact on the central tendency of the data under different situations.
- To explore the relative merits of different measures of central tendency for a given situation, and choose an appropriate average to reflect the central tendency of the data.
- To know the misuse of averages in various daily-life situations, and recognize the dangers of misusing averages.
- To understand weighted mean and its application in real-life situations.

Teaching Suggestion

- When introducing the topic on misuse of statistics, emphasis should be laid on how data are deliberately misrepresented to lead to a wrong conclusion.
- For abler students, teachers may use Hang Seng Index and Consumer Price Index etc. to illustrate the application of weighted mean in daily life. However, students are not required to learn the detailed concepts and the calculations of the index numbers.

Teaching Schedule

Objective	Contents	Cycle/ Date	Suggested Teaching Period	Exercise	Remarks

Objective	Contents	Cycle/ Date	Suggested Teaching Period	Exercise	Remarks
<ul style="list-style-type: none"> To stimulate learning motivation. To do a revision on the basic knowledge and techniques required for this chapter. To identify the misleading elements in diagrams and accompanying statements, and recognize the dangers of misinterpreting statistical data. Involving the basic competency under code <i>KS3-DH2-6</i>. To explore the effect of changes in data on averages. To know the features of different averages and learn to choose an appropriate average. To discuss the misuse of averages in daily life, and recognize the dangers of misusing averages. Involving the basic competency under code <i>KS3-DH3-4</i>. To do a revision on the concepts of percentage increase and percentage decrease. To learn how to solve problems involving percentage increase and percentage decrease. To remind students the essential knowledge acquired in the chapter. 	<p>Title page, Preview</p> <p>11.1 Misuse of Statistics</p> <p>11.2 Use and Misuse of Averages</p> <p>A. Effect of changes in data on averages</p> <p>B. Choosing appropriate averages</p> <p>C. Misuse of averages</p> <p>11.3 Weighted Mean</p> <p>Chapter Summary</p>		<p>3</p> <p>4</p> <p>2</p> <p>2</p>	<p>Exercise 11A (page 11.7)</p> <p>Exercise 11B (page 11.19) Exercise 11C (page 11.27)</p> <p>Exercise 11D (page 11.32)</p> <p>Check Yourself (page 11.36) Revision Exercise 11 (page 11.38)</p>	<p>Refer to <i>Hint for the Title Page Question</i> (page 11.45)</p> <p>Class Activity 11.1 (page 11.2)</p> <p>Class Activity 11.2 (page 11.12) Class Activity 11.3 (page 11.14) Class Activity 11.4 (page 11.15) Class Activity 11.5 (page 11.17) I.T. tool (page 11.12)</p> <p>Class Activity 11.6 (page 11.29)</p>

