

**Term 1: Unit 1 – Numbers and Indices**

**Year 7 Australian Curriculum Achievement Standard:**

By the end of Year 7, students solve problems involving the comparison, addition and subtraction of integers. They make the connections between whole numbers and index notation and the relationship between perfect squares and square roots. They solve problems involving percentages and all four operations with fractions and decimals. They compare the cost of items to make financial decisions. Students represent numbers using variables. They connect the laws and properties for numbers to algebra. They interpret simple linear representations and model authentic information. Students describe different views of three-dimensional objects. They represent transformations in the Cartesian plane. They solve simple numerical problems involving angles formed by a transversal crossing two lines. Students identify issues involving the collection of continuous data. They describe the relationship between the median and mean in data displays.

Students use fractions, decimals and percentages, and their equivalences. They express one quantity as a fraction or percentage of another. Students solve simple linear equations and evaluate algebraic expressions after numerical substitution. They assign ordered pairs to given points on the Cartesian plane. Students use formulas for the area and perimeter of rectangles and calculate volumes of rectangular prisms. Students classify triangles and quadrilaterals. They name the types of angles formed by a transversal crossing parallel line. Students determine the sample space for simple experiments with equally likely outcomes and assign probabilities to those outcomes. They calculate mean, mode, median and range for data sets. They construct stem-and-leaf plots and dot-plots.

**Unit Overview:**

Students solve problems involving the comparison, addition and subtraction of integers. They make the connections between whole numbers and index notation and the relationship between perfect squares and square roots.

**Assessment Overview:**

**Task:** Item 1: Numbers and Indices  
In-class supervised examination (technology free / non-calculator)

**Key Skill/s:**  
To connect whole numbers and index notations; to solve problems involving integers.

**Conditions:**  
Length: Up to 45 minutes  
Completed under Exam Conditions (as per KSHS Exam Protocol)  
Calculators NOT permitted

<b>Guaranteed Vocabulary:</b>	<b>Design Question Four Strategy</b>	<b>Design Question Five Strategy</b>	<b>21<sup>st</sup> Century Skill:</b>
Integers Prime numbers Composite numbers Index notation Whole numbers Square root Perfect square numbers Associative law Commutative law Distributive law Powers	Element 9: <u>Using Structured Practice Sessions</u> Students will already have some knowledge of prime, composite and square numbers, they will revise and extend this knowledge through opportunities for guided, modelled and collaborative learning. Students will engage in structured practice sessions prior to testing and assessment.	Element 12: <u>Engaging students in Cognitively Complex Tasks</u> Students will be able to explain the conclusions that they have generated. Teachers will engage students in problem-solving tasks that require them to make decisions in order to test hypotheses.	Students will:

Guaranteed Skills/Language Features:	Reading Comprehension Skill and Strategy	Cognitive Verbs	ICT to Enhance Learning:
<p>Compare and order integers            Add and subtract integers            Identify prime and composite numbers            Identify perfect squares and their square roots            Understand the number laws            Use index and expanded notation            Construct factor trees</p>	<p><b>Reading as a Mathematician</b></p> <p><b>Students will complete the following steps when starting a problem:</b></p> <ol style="list-style-type: none"> <li>1. Scan the whole problem.</li> <li>2. Identify the task. It could be a:</li> <li>3. Reread the problem. What is important to help you solve the problem?</li> <li>4. Translate - (create a mathematical model)</li> <li>5. Solve the problem.</li> </ol>	<p>Apply            Compare            Define            Explain            Express            Investigate            Solve            Understand            Identify</p>	<p>Mathspace            Sumdog            Scientific calculators</p>

**Learning Goals:**

Strands and Sub-Strands	Australian Curriculum Content Descriptors	Australian Curriculum Elaborations	Kirwan High Learning Goals
<b>Number</b>	Investigate index notation and represent whole numbers as products of powers of prime numbers (ACMNA149)	<ul style="list-style-type: none"> <li>• defining and comparing prime and composite numbers and explaining the difference between them</li> <li>• applying knowledge of factors to strategies for expressing whole numbers as products of powers of prime factors, such as repeated division by prime factors or creating factor trees</li> <li>• solving problems involving lowest common multiples and greatest common divisors (highest common factors) for pairs of whole numbers by comparing their prime factorisation</li> </ul>	<ul style="list-style-type: none"> <li>• Define and compare prime and composite numbers</li> <li>• Express whole numbers as products of powers of prime factors</li> </ul>
	Investigate and use square roots of perfect square numbers (ACMNA150)	<ul style="list-style-type: none"> <li>• investigating square numbers such as 25 and 36 and developing square-root notation</li> <li>• investigating between which two whole numbers a square root lies</li> </ul>	<ul style="list-style-type: none"> <li>• Identify perfect square numbers</li> <li>• Determine the square roots of perfect square numbers</li> </ul>
	Apply the associative, commutative and distributive laws to aid mental and written computation (ACMNA151)	<ul style="list-style-type: none"> <li>• understanding that arithmetic laws are powerful ways of describing and simplifying calculations</li> </ul>	<ul style="list-style-type: none"> <li>• Recognise that some operations can have the same outcome regardless of the order of the numbers (commutative law)</li> <li>• Understand that when we add or multiply, it does not matter how we group the numbers (associative law)</li> <li>• Understand that multiplying a number by a group of numbers added or subtracted together is the same as doing each multiplication separately (distributive law)</li> </ul>
	Compare, order, add and subtract integers (ACMNA280)		<ul style="list-style-type: none"> <li>• Compare, order, add and subtract integers</li> </ul>