

Year 7		Western Adelaide Region - Maths Assessment Tasks Map (Draft – November 2013)							Proficiency Strands		
Aims		<p>The Australian Curriculum Mathematics aims to ensure that studentsare confident, creative users and communicators of mathematics, able to investigate, represent and interpret situations in their personal and work lives and as active citizens; develop an increasingly sophisticated understanding of mathematical concepts and fluency with processes, and are able to pose and solve problems and reason in <i>Number and Algebra, Measurement and Geometry, and Statistics and Probability</i>; recognise connections between the areas of mathematics and other disciplines and appreciate mathematics as an accessible and enjoyable discipline to study.</p>							<ul style="list-style-type: none"> • Understanding • Fluency • Problem Solving • Reasoning 		
Content Strands		Number & Algebra									
Sub Strands		Number & Place Value		Real Numbers				Money and Financial Mathematics	Patterns & Algebra	Linear and Non-linear Relationships	
Big Idea / Concept/ Key Understanding		Additive to Multiplicative Thinking		Partitioning				-Best buys can be determined by comparing the costs of items using metric units or by comparing monetary values	-Understanding arithmetic laws leads to the understanding of algebra -Patterns can be represented in many ways and can consist of multiple operations and inverse operations	-Concrete models will assist in the calculation and understanding of linear equations -There can be patterns that exist when plotting points of integer values	
		<p>-Numbers have special properties that can be used to solve problems (e.g. factor, multiple, prime)</p> <p>-Arithmetic laws are powerful ways of describing and simplifying calculations</p> <p>-An integer is any whole number that is positive, negative or zero</p>		<p>-The denominator of a fraction names the part. The numerator tells their number – how many</p> <p>-A unit fraction is a fraction whose numerator is 1 (e.g. 1/3: in 2/3 the unit is 1/3 and we have 2 of them)</p> <p>-Representations of quantities can be expressed as decimals, fractions and percentage</p> <p>-The decimal numeral system has 10 as the base. A decimal is a tenth part (e.g. 0.6 is 6 tenths of a part, the part being 1 whole)</p> <p>-A decimal fraction is a fraction whose denominator is a power of ten (e.g. 6 tenths, 6 hundredths, 6 thousandths, etc.)</p>							
Australian Curriculum Content Descriptor		Investigate index notation and represent whole numbers as products of powers of prime numbers	Apply the associative, commutative and distributive laws to aid mental and written computation	Compare fractions using equivalence	Solve problems involving addition and subtraction of fractions, including those with unrelated denominators	Multiply and divide fractions and decimals using efficient written strategies and digital technologies	Express one quantity as a fraction of another, with and without the use of digital technologies	Recognise and solve problems involving simple ratios	Investigate and calculate 'best buys', with and without digital technologies	Introduce the concept of variables as a way of representing numbers using letters	Given coordinates, plot points on the Cartesian plane, and find coordinates for a given point
		Compare, order, add and subtract integers		Locate and represent positive and negative fractions and mixed numbers on a number line		Round decimals to a specified number of decimal places	Find percentages of quantities and express one quantity as a percentage of another, with and without digital technologies		Create algebraic expressions and evaluate them by substituting a given value for each variable	Solve simple linear equations	
Achievement Standard		Students solve problems involving the comparison, addition and subtraction of integers Students make the connections between whole numbers and index notation and the relationship between perfect squares and square roots		Students use fractions, decimals and percentages , and their equivalences	Students solve problems involving percentages and all four operations with fractions and decimals		Students express one quantity as a fraction or percentage of another	Students compare the cost of items to make financial decisions.	Students represent numbers using variables Students connect the laws and properties for numbers to algebra	Students assign ordered pairs to given points on the Cartesian plane	Students interpret simple linear representations and model authentic information Students solve simple linear equations and evaluate algebraic expressions after numerical substitution
Summative Assessment Task		7.1 'Help!' Poster Number Properties		7.2 Fractions, Decimals & Percentages Sleep Requirements					7.3 Patterns & Algebra	7.4 Where's My iPhone?	

7.1 – Number & Place Value

Compare, order, add subtract integers;
Investigate prime numbers and square roots

Western Adelaide Region

Mathematics Performance Assessment Tasks (Updated: November 2013)

Year 7

Big Idea(s) -Numbers have special properties that can be used to solve problems (e.g. factor, multiple, prime). -Arithmetic laws are powerful ways of describing and simplifying calculations. -An integer is any whole number that is positive, negative or zero.	Australian Curriculum Content Descriptor Investigate index notation and represent whole numbers as products of powers of prime numbers. Compare, order, add and subtract integers. Investigate and use square roots of perfect square numbers.	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.	Related Mathematical Proficiencies <ul style="list-style-type: none"> Understanding includes describing patterns in uses of indices with whole numbers Fluency includes calculating accurately integers Reasoning includes applying number laws to calculations
Prior Learning Experiences Do I use ongoing Formative Assessment to inform the teaching & learning cycle? Do I provide learning experiences that enable students to build on their knowledge?	Feedback How will I provide feedback to students?	Summative Assessment Does the assessment task indicate how well students understand and can apply their learning? (how well = extent, depth and sophistication of thinking – informs A-E grading)	Evidence What evidence am I looking for that demonstrates the student has got it?
<p><u>It is important that students have had experiences with the learning opportunities below before administering the assessment task.</u></p> <p>Developing: Understanding Fluency Problem Solving Reasoning</p> <p>Through experiences with:</p> <ul style="list-style-type: none"> Use a 100s chart to revise & explore properties of numbers (multiple, factor, integer, prime, composite, square, triangular) through mental routines (Natural Maths) Use mental routines to explore factors and multiples to develop fluency and automaticity for the recall of number facts and when exploring the four operations. Also use speed drills, personal bests for students who are more competent, use this time to assist other students & provide intervention. Revise efficient strategies for computation for the 4 operations through strategies such as chunking, open number lines, partial algorithms, balance & compensate, round & adjust, landmark numbers (Natural Maths – Middle Years Mental Computation) Problematised situations (Natural Maths) involving the four operations and multi-step problems Revise number facts through factor trees and identifying multiples Use calculators to assist with problem solving Develop the vocabulary associated with number properties or create a mathematics word wall Explore commutative, distributive & associative laws, through creating definitions and exploring a range of examples. Locate and order integers (positive and negative) on a number line, including revising place value & decimal place value Explore index notation & powers of 10, i.e. The exponent (or index or power) of a number says how many times to use the number in a multiplication. 10^2 means $10 \times 10 = 100$ (It says 10 is used 2 times in the multiplication) Create posters or 'help sheets' to explain number properties and to give examples (e.g. ordering integers on a number line; number sentences to model commutative, distributive & associate laws; number sentences to demonstrate index notation) 	<p>Teacher observations</p> <p>Conferences 1:1 with peers & teacher</p> <p>Learning log: Student identifies areas for focus</p> <p>SNW (S- strengths, N – needing improvement, W- where to next)</p>	<p>Option 1: 'Help!' Poster Entry Level Mr. L's class were learning about number properties but they were having trouble understanding all of the different terms. They kept getting all of their examples mixed up and no one could answer any of the task questions correctly. One of the students said that he had a good idea and that they could make 'Help' posters to use when they were working on the tasks. Mr. L thought that was a great idea and they all made their own 'Help!' posters. What do you think the posters might have looked like? *Brainstorm the terms to be used on the posters- this will vary depending on what content has been covered so far. Encourage students to access the information using ICT resources, however emphasise the examples must be their own.</p> <p>Challenge Level Students are asked to choose 1 example and write a real-world word problem.</p> <p>Option 2: Number Properties (see attachment 7.1) Entry Level Students complete the Number Properties table of information and questions (attachment 7.1). The task may require some explanation and a few examples prior to students completing the task. The aim is for students to recognise and categorise 4 given numbers in relation to their properties and explain their choices.</p> <p>Challenge Level Students complete the 3 question boxes at the bottom of the page.</p> <p>Questioning – "What do you understand the term factor/multiple/square/prime/etc. to mean?" "Could the numbers be placed in more than one category? Why?" "Why did you choose ... numbers for your own examples?" "Explain how you calculated the temperature ranges?" "Explain how you solved...?" "Could you have used a different example for...?"</p> <p>Organisation Teacher – A3 paper for student posters; copies of attachment 7.1 Students – A3 paper; attachment 7.1; pencils/pens/textas</p>	<p>Students will:</p> <ul style="list-style-type: none"> Demonstrate knowledge by providing a range of examples to describe number properties Show understanding by applying their knowledge to a number properties task requiring students to categorise 4 given numbers. <p>Advanced – Students demonstrate an understanding of number properties and make strong connections between them. They provide explicit and detailed examples on their 'Help!' poster and write a real world word problem. They successfully complete the number properties table and associated questions and explain all of their choices using logical and mathematical reasoning.</p> <p>Competent – Students demonstrate an understanding of number properties and make connections between them. They choose more simple terms on their 'Help!' board and provide an example for each of the terms used. They complete the number properties task with understanding and may require some clarification. They explain their choices using mostly mathematical terms.</p> <p>Developing – Students demonstrate some/little understanding of number properties. They create a 'Help!' poster using only one or two simple terms and examples. They experience difficulty with the number properties task and require additional scaffolding. They are unable to explain their choices using mathematical reasoning.</p>

7.2 – Real Numbers

Use equivalent fractions, decimals and percentages; Locate fractions on a number line

Western Adelaide Region

Mathematics Performance Assessment Tasks (Updated: November 2013)

Year 7

<p>Big Idea(s)</p> <p>-Representations of quantities can be expressed as decimals, fractions and percentage.</p> <p>-The decimal numeral system has 10 as the base. A decimal is a tenth part (e.g. 0.6 is 6 tenths of a part, the part being 1 whole).</p> <p>-A decimal fraction is a fraction whose denominator is a power of ten (e.g. 6 tenths, 6 hundredths, 6 thousandths, etc.).</p>	<p>Australian Curriculum Content Descriptor</p> <p>Compare fractions using equivalence.</p> <p>Locate and represent positive and negative fractions and mixed numbers on a number line.</p> <p>Solve problems involving addition and subtraction of fractions, including those with unrelated denominators.</p> <p>Multiply and divide fractions and decimals using efficient written strategies and digital technologies.</p>	<p>Achievement Standard</p> <p>By the end of Year 7, students use fractions, decimals and percentages, and their equivalences. They solve problems involving percentages and all four operations with fractions and decimals.</p>	<p>Related Mathematical Proficiencies</p> <ul style="list-style-type: none"> • <i>Understanding</i> includes recognising equivalences between fractions, decimals, percentages and ratios • <i>Fluency</i> includes representing fractions in various ways
<p>Prior Learning Experiences</p> <p>Do I use ongoing Formative Assessment to inform the teaching & learning cycle? Do I provide learning experiences that enable students to build on their knowledge?</p>	<p>Feedback</p> <p>How will I provide feedback to students?</p>	<p>Summative Assessment</p> <p>Does the assessment task indicate how well students understand and can apply their learning? (how well = extent, depth and sophistication of thinking – informs A-E grading)</p>	<p>Evidence</p> <p>What evidence am I looking for that demonstrates the student has got it?</p>
<p><u>It is important that students have had experiences with the learning opportunities below before administering the assessment task.</u></p> <p>Developing:</p> <p>Understanding Fluency Problem Solving Reasoning</p> <p>Through experiences with:</p> <ul style="list-style-type: none"> • Mental routines with fractions involving equivalence and the 4 basic processes. • Mental routines converting % to decimals and fractions • Develop automaticity with the landmark % fractions and decimals- 10%, 20%, 50%,75%, • Explore and develop efficient strategies for expressing one quantity as a fraction of another • Develop efficient strategies for calculating % of quantities, and for expressing one quantity as a % of another • Develop efficient strategies for multiplication and division involving fractions and decimals • Explore the relationship between %, fractions and decimals • Using a number line to locate %, fractions and decimals • A range of Problem solving situations involving % and all 4 operations with fractions and decimal • Locating and highlighting the relevant information and facts in worded problems 	<p>Teacher observations</p> <p>Conferences 1:1 with peers & teacher</p> <p>Learning log: Student identifies areas for focus</p> <p>SNW (S- strengths, N – needing improvement, W- where to next)</p>	<p>Task 1: Fractions, Decimals & Percentages (see attachment 7.2A)</p> <p>Entry Level</p> <p>Students complete the 4 quadrants of the thinkboard (<i>The Answer is 80%</i>) with at least one example in each quadrant to demonstrate their knowledge of fractions, decimals and percentages. (<i>Please note: you may wish to choose a different percentage than 80%, however please ensure this is in a new context and not familiar, i.e. 10%, 20%, 50%</i>)</p> <p>Challenge Level</p> <p>Students draw and complete their own choice thinkboard (The Answer is...) with multiple answers including reducing a fraction to its lowest terms.</p> <p>Task 2: Sleep Requirements (see attachment 7.2B)</p> <p>Entry Level</p> <p>Students are given attachment 7.2B to complete. Students are required to hand up a recording page to show their thinking and calculations as part of the assessment. <i>Some students at this level may require additional support such as a conversion information page/chart. You might ask particular students to only complete part of the table if this is too challenging or you might complete some of the boxes for them to give additional information.</i></p> <p>Challenge Level</p> <p>Draw a diagram/graph that best represents the information contained in the table.</p> <p>Questioning – “What strategies did/could you use to convert between percentages, fractions and decimals?” “What other facts do you need to know?” “When might a calculator be useful in your working out?” “What do you find easiest to understand percentage, fractions or decimals? Why?” “Is there anything that surprises you about the sleep information?” “What graphs or diagrams do you know about that could represent this type of information?” “Where have you seen a similar table or chart before?”</p> <p>Organisation</p> <p>Teacher – copies of attachments 7.2A & 7.2B; paper; access to calculators</p> <p>Students – attachments 7.2A & 7.2B; paper for recording; pencils</p>	<p>Students will:</p> <ul style="list-style-type: none"> • Demonstrate knowledge by using efficient strategies to solve a given problem and by converting between fractions, decimals and percentages with accuracy. • Show understanding by explaining strategies used and applying their knowledge to solve more complex questions. <p>Advanced –Students demonstrate understanding by simplifying fractions and using a variety of representations and examples on their thinkboard. They produce sophisticated real life examples, word problems, pictures and/or diagrams. They create their own thinkboard using a more challenging percentage (e.g. 65%, 150%). Students complete the Sleep Requirements table with accuracy and demonstrate efficient and fluent strategies on their recording page. They answer each of the task questions and complete the challenge question by drawing/creating a diagram or graph to represent the data. They explain their graph or diagram using mathematical reasoning and understanding of data sets.</p> <p>Competent - Students demonstrate understanding on their thinkboard by recording appropriate examples for 80%. They produce a real life example, word problem, picture and/or diagram. They attempt to create their own thinkboard using a simple landmark number (e.g. 25%, 75%, 50%, 100%) as their percentage. Students complete the Sleep Requirements table for the simple fractions (e.g. newborns, pre-schoolers, adults) and attempt the task questions. They demonstrate efficient strategies for their calculations on their recording page.</p> <p>Developing – Students demonstrate some/little understanding of fractions, decimals and percentage and the relationship between them. The fractions, pictures and diagrams may not be accurate representations of 80%. Students require additional scaffolding to attempt the Sleep Requirements task. They provide limited responses to task questions.</p>

7.3 – Patterns & Algebra

Represent numbers using variables; Connect laws and properties of numbers

Western Adelaide Region

Mathematics Performance Assessment Tasks (Updated: November 2013)

Year 7

<p>Big Idea(s)</p> <ul style="list-style-type: none"> -Understanding arithmetic laws leads to the understanding of algebra. -Patterns can be represented in many ways and can consist of multiple operations and inverse operations. 	<p>Australian Curriculum Content Descriptor</p> <p>Introduce the concept of variables as a way of representing numbers using letters. Create algebraic expressions and evaluate them by substituting a given value for each variable. Extend and apply the laws and properties of arithmetic to algebraic terms and expressions.</p>	<p>Achievement Standard</p> <p>By the end of Year 7, students represent numbers using variables. They connect the laws and properties for numbers to algebra.</p> <p>Related Mathematical Proficiencies</p> <ul style="list-style-type: none"> • <i>Understanding</i> includes connecting the laws and properties of numbers in algebraic terms and expressions • <i>Reasoning</i> includes applying the number laws to calculations
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<p>Prior Learning Experiences</p> <p>Do I use ongoing Formative Assessment to inform the teaching & learning cycle? Do I provide learning experiences that enable students to build on their knowledge?</p>	<p>Feedback</p> <p>How will I provide feedback to students?</p>	<p>Summative Assessment</p> <p>Does the assessment task indicate how well students understand and can apply their learning? (how well = extent, depth and sophistication of thinking – informs A-E grading)</p>	<p>Evidence</p> <p>What evidence am I looking for that demonstrates the student has got it?</p>
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<p><u>It is important that students have had experiences with the learning opportunities below before administering the assessment task.</u></p> <p><i>Developing:</i> Understanding Fluency Problem Solving Reasoning</p> <p><u>Through experiences with:</u></p> <ul style="list-style-type: none"> • Practise patterning using a variety of materials • Explore complex patterns with more than one variable • Practise with equivalent expressions, exploring “equals” • Recording equivalent expressions where the answer is not just after the = sign (e.g. $7 + 3 = 8 + ?$) • Revise number properties & revisit efficient strategies for mental computation • Problem solving situations involving multi-step and combinations of the four operations, including exploring how to record solutions as a step by step process • Problem solving situations where there are unknown quantities or variables within quantities (if X is ..., then Y could be ... or...). This could include student generated ‘guess my rule’ games/activities. • Substitute pronumerals and symbols for numbers, practice explaining thinking about how to find values for pronumerals • Create their own algebraic expressions and substituting values for pronumerals • Explore ratio tables as a way of problem solving (search Professor Shelley Dole, <i>Proportional Reasoning for ideas</i>) such as completing tables according to rules and expressions provided (to find d, add 4 to p; s is equal to 10 times f; $n = m + 6$, $g = 2k$, $h = 3r - 1$) • Explore order of operations with and without digital technologies • Explore BEDMAS, including using bracket in an Excel spreadsheet. BEDMAS- 1. Calculations must be done from left to right. 2. Calculations in brackets (parenthesis) are done first. When you have more than one set of brackets, do the inner brackets first. 3. Exponents/Orders (or radicals) must be done next. 4. Multiply and divide in the order the operations occur. 5. Add and subtract in the order the operations occur. • Use interactive software programs such as, Natural Maths- The Card Game & Maths300 (inexpensive for site licences) • Create a word wall or ‘help sheets’ to display in the classroom 	<p>Teacher observations</p> <p>Conferences 1:1 with peers & teacher</p> <p>Learning log: Student identifies areas for focus</p> <p>SNW (S-strengths, N – needing improvement, W- where to next)</p>	<p>Patterns and Algebra (see attachment 7.3) (Adapted from Pearson Mathematics Book for Year 7 Students)</p> <p>Entry Level Students use the rules given to insert the missing numbers into the tables, using the following examples:</p> <ul style="list-style-type: none"> ▪ To find y, subtract 4 from x ▪ n is equal to m multiplied by 3 ▪ To find d, add 10 to c, then multiply by 5 ▪ $y = 2x + 4$ <p>They write the rules for each example as an algebraic expression/equation. Students attempt to write their own algebraic equation and provide the values for it (question 4).</p> <p>Challenge Level Mr Lang posed the following problem to his year 7 class (question 5):</p> <ul style="list-style-type: none"> ▪ Substitute $x = 5$ into $y = 8x + 3$ ▪ Each student provided their working out. <p>Kym’s answer was $y=88$ Jordan’s answer was $y=43$ Does either have the correct answer? Explain your choice. How would you explain to another student how to work this out? Write another problem similar to this, calculate the answer and explain your process in creating the problem.</p> <p>Questioning – “What other pronumerals could you use?” “Does ‘y’ always have the same value?” “Can you think of other algebraic expressions?” “When might you use algebra in everyday life?” “What did/do you find challenging? Easy? Why?”</p> <p>Organisation Teacher – copies of attachment 7.3 Students – attachment 7.3; pen/pencil</p>	<p>Students will:</p> <ul style="list-style-type: none"> • Demonstrate knowledge by correctly identifying the missing numbers by inserting a range of different given rules into number sentences. • Show understanding by applying knowledge of substitution of pronumerals to solve a problem solving question and by explaining their choices. <p>Advanced – Students demonstrate understanding by correctly completing questions 1 – 4. They use their knowledge of pronumerals to complete a range of number sentences using substitution. They correctly identify the rule used in each question. They choose the correct answer from the 2 examples given in the problem solving task and clearly explain their choice using appropriate mathematical reasoning, such as explaining that $8x$ means 8 multiplied by x. They write their own problem using substitution and correct algebraic expressions. They provide supporting examples and appropriate explanations.</p> <p>Competent – Students demonstrate an understanding of algebra and the use of pronumerals. They connect the laws and properties for numbers with algebra by completing the tables for questions 1 – 4, inserting the values for the pronumerals. They write the rule for questions 1 – 4 using correct algebraic expressions. The attempt to solve the problem solving question with basic understanding.</p> <p>Developing – Students demonstrate some/little understanding of the use of pronumerals and require additional support to connect the laws and properties for numbers to algebra. They attempt to solve questions 1-4 with some/little success.</p>
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<p>Big Idea(s) -Concrete models will assist in the calculation and understanding of linear equations. -There can be patterns that exist when plotting points of integer values.</p>	<p>Australian Curriculum Content Descriptor Given coordinates, plot points on the Cartesian plane, and find coordinates for a given point. Solve simple linear equations. Investigate, interpret and analyse graphs from authentic data.</p>	<p>Achievement Standard By the end of Year 7, students assign ordered pairs to given points on the Cartesian plane. They interpret simple linear representations and model authentic information. They solve simple linear equations and evaluate algebraic expressions after numerical substitution.</p>	<p>Related Mathematical Proficiencies • <i>Understanding</i> includes plotting points on a Cartesian plane</p>
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<p style="text-align: center;">Prior Learning Experiences</p> <p><i>Do I use ongoing Formative Assessment to inform the teaching & learning cycle? Do I provide learning experiences that enable students to build on their knowledge?</i></p>	<p style="text-align: center;">Feedback</p> <p><i>How will I provide feedback to students?</i></p>	<p style="text-align: center;">Summative Assessment</p> <p><i>Does the assessment task indicate how well students understand and can apply their learning? (how well = extent, depth and sophistication of thinking – informs A-E grading)</i></p>	<p style="text-align: center;">Evidence</p> <p><i>What evidence am I looking for that demonstrates the student has got it?</i></p>
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<p><u><i>It is important that students have had experiences with the learning opportunities below before administering the assessment task.</i></u></p> <p><i>Developing:</i> Understanding Fluency Problem Solving Reasoning</p> <p><u>Through experiences with:</u></p> <ul style="list-style-type: none"> • Locating points on a Cartesian plane • Identifying coordinates on a Cartesian plane • Reading and interpreting maps • Plotting journeys on maps using grid coordinates • Practise naming locations using fractions / decimals when they are between whole number coordinates on a Cartesian plane. e.g. (6.5, 9) • Practise using street directories • Simple linear equations using x and y • Plotting simple linear equations on a Cartesian plane e.g. (x = y), (y = x + 2), (y = 2x) • Using grid paper to construct x and y axis • Playing games involving coordinates (e.g. Battleships) • Practise substituting values for x or y in linear equations • Math300 tasks (<i>Education Services, Victoria</i>) 	<p>Teacher observations</p> <p>Conferences 1:1 with peers & teacher</p> <p>Learning log: Student identifies areas for focus</p> <p>SNW (S- strengths, N – needing improvement, W- where to next)</p>	<p>Where’s My iPhone? <i>(see attachment 7.4)</i> Students use a grid/Cartesian plane to locate points on a map, use ordered pairs of coordinates to describe locations and interpret and record linear equations.</p> <p>Entry Level Students use and interpret coordinates to locate and describe locations. They interpret information from a key. They locate points on a grid described by a linear equation.</p> <p>Challenge Level Students successfully complete the Entry level activities. They plot a course using ordered pairs of coordinates. They record information on a key. Students describe a course using coordinates. They use information to write a linear equation to describe possible locations.</p> <p>Questioning – “Which axis is listed first in a pair of coordinates?”, “What are the labels of the 2 axis?” “What other linear equations produce straight lines on a Cartesian plane?” “Where do you find Cartesian planes and grids in real life?”</p> <p>Organisation Teacher – provide Attachment 7.4 (2 pages) to each student Students – Attachment 7.4, pencil, pen, ruler, marker pens</p>	<p>Students will:</p> <ul style="list-style-type: none"> • Demonstrate knowledge by using coordinates to plot and locate points on a Cartesian Plane • Show understanding by interpreting and describing pathways on a Cartesian Plane using linear equations • Demonstrate Reasoning by developing Treasure Hunt course and checkpoints using coordinates. <p>Advanced –Students demonstrate understanding by accurately locating and describing locations on the map. They interpret and write linear equations to describe pathways on the map. They include several possibilities that satisfy the linear equation. They describe areas defined by coordinates. Students develop a viable, logical treasure hunt course that includes checkpoints accurately defined by sets of coordinates.</p> <p>Competent – Students demonstrate an understanding of grids, Cartesian Planes and coordinates by locating landmarks on the map. They connect sets of coordinates to define a pathway. Students locate one or more points on the map defined by a linear equation. They include some possibilities that satisfy the linear equation. They attempt to write their own linear equation to describe a pathway. Students describe a basic treasure hunt course using coordinates and accurately include at least one checkpoint.</p> <p>Developing – Students demonstrate some/little understanding of grids, Cartesian Planes and coordinates. They locate and place some landmarks and regions described by coordinates. They identify one, or a few, possibilities that satisfy the linear equation. They require scaffolding to write their own linear equation.</p>
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ATTACHMENT 7.1 NUMBER PROPERTIES

All numbers have special properties. Each of the numbers below can be described by more than one of the number properties. Place these numbers next to their properties.
 The number "3" can be placed in one or more of the categories below. The number "16" can be placed in one or more of the categories below.
 The number "-8" can be placed in one or more of the categories below. The number "225" can be placed in one or more of the categories below.

Choose your own numbers to place in the "your own examples" column. Explain your choices.

NUMBER PROPERTIES	3, 16, -8, 225	YOUR OWN EXAMPLES	EXPLAIN YOUR CHOICES
FACTORS OF 48			
MULTIPLES OF 3			
PRIME			
COMPOSITE			
POSITIVE			
NEGATIVE			
SQUARE NUMBERS			
SQUARE ROOTS			

Order the numbers 225, 3, 16, -8 from smallest to largest by placing them on an open number line.

Is there one number that can be placed in all of these categories? Explain your answer.

What are the prime factors of-

25

24

225

Kym and Jade's teacher presented the class with the following problem-

$$6+4 \times 3-20$$

Kym said the answer was -2

Jade said the answer was 10

Is either correct? Explain your thinking.

Which of these locations has the larger temperature range?

3. Canberra Low minus 10.0°C

High 42.2°C

4. Mt Kosciusko Low minus 23 °C

High 33 °C

Explain your thinking.

Source www.bom.sa.gov.au

FRACTION/S	DECIMAL	PICTURE OR DIAGRAM	
NUMBER LINE	THE ANSWER IS 80%		WHERE MIGHT YOU SEE THIS IN THE REAL WORLD?
REAL-LIFE WORD PROBLEM			

CHALLENGE: CREATE YOUR OWN THINKBOARD USING A DIFFERENT ANSWER

The National Sleep Foundation (USA) produced the following table to indicate ideal hours of sleep required at different ages. Use this information to complete the table and tasks below. (Information from <http://kidshealth.org>)

THE TABLE OF SLEEP REQUIREMENTS PER 24 HOURS

AGE	SLEEP NEEDS	FRACTION/S		PERCENTAGES	DECIMALS
Newborns	? ___ hours			75%	
Infants	15 hours				
Toddlers	14 hours				
Pre-schoolers	? ___ hours	$\frac{12}{24}$	$\frac{1}{2}$		
School-age children	11 hours				
Teens	9.5 hours				
Adults	8 hours				0.33

TASKS

- Show all your working out for the answers in the table on your working page.
- Which age was the most challenging to work out? Would access to a calculator make this easier? Why?
- Which of Fractions, Percentages or Decimals should the National Sleep Foundation use to share this information with families? Explain your thinking?
- What is the total for all the percentages across these ages? Why do you think the answer is more than 100%?
- Estimate the percentage of time that you spend each school day engaged in the following activities:-
 - Sleeping
 - At school
 - Recreation
 - Eating
 - Other

Challenge Task: Draw a diagram/graph that best represents this information.

Attachment 7.3 - Patterns and Algebra Task

Name:

Date:

1. To find y , subtract 4 from x

x	7	16	23	49	67.5
y					

Write the rule using Algebra

2. n is equal to m multiplied by 3

m	0	1	3	7	10
n					

Write the rule using Algebra

3. To find c , add 10 to c , then multiply by 5

c	0	2	7	-4	1.1
d					


Write the rule using Algebra

4. Complete the values for y if $y = 2x + 4$

x	0	1	2	3	4
y					


Write your own rule using Algebra, and complete the table

5. Mr. Lang, the year 7 teacher, asked his students to substitute $x = 5$ into $y = 8x + 3$
This is what Kym and Jordan came up with -



Kym

Substitute $x = 5$ into $y = 8x + 3$

$$y = 8x + 3$$
$$x = 5$$
$$y = 8 \times 5 + 3$$
$$y = 88$$


Jordan

Substitute $x = 5$ into $y = 8x + 3$

$$y = 8x + 3$$
$$x = 5$$
$$y = 8 \times 5 + 3$$
$$y = 40 + 3$$
$$y = 43$$

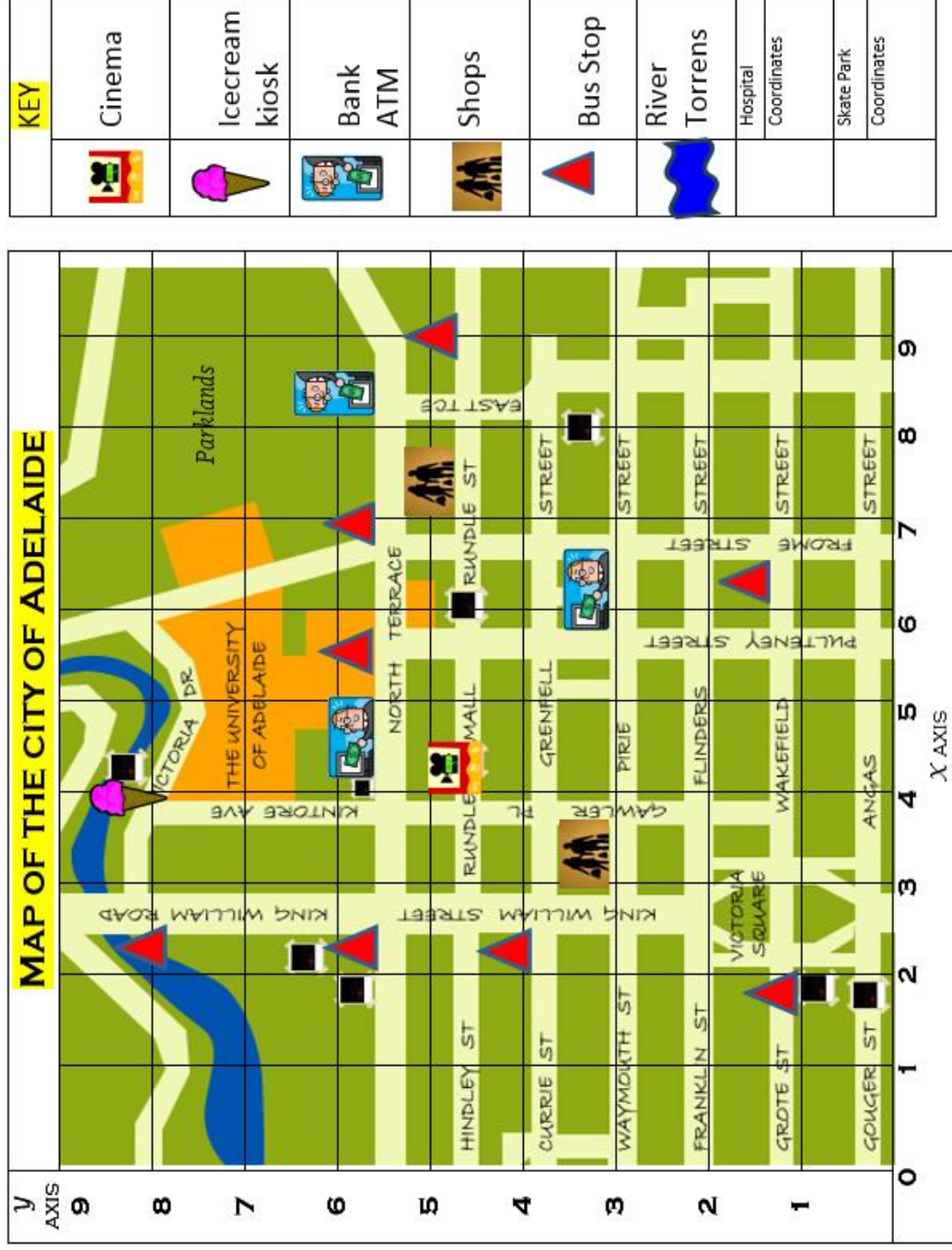
Does either of these students have the correct answer?
Explain your choice.

How would you explain to another student how to work out this problem?

Write another problem like this, work out the answer and explain your thinking.

Attachment 7.4 Where's My iPhone?

Attachment 7.4 Where's My iPhone?



- Sammy and friends spent the day in the city. They met at the cinema in Rundle Mall. What coordinates describe the location of the cinema?
- From there they walked to coordinates (7, 4). Which 2 streets meet near this point?
- They had lunch in Victoria Square. What coordinates best describe the part of Victoria Square where Franklin Street, Flinders Street and King William Streets meet?
- The group then caught the bus along King William Road to the River Torrens. They walked to the kiosk for ice-cream. What coordinates describe the location of the kiosk?
- Sammy then went shopping at coordinates (7.5, 5). Which 4 streets surround this store. When Sammy reached the ATM on Pirie Street, he realised he had lost his iPhone. He decided to map out a pathway to retrace his movements. He started at (6, 3) then walked to (3, 3). He continued to (4, 4.5), then (7, 5) and was on his way to (4, 8) when he saw his phone under a bench at (4.5, 7). Use a pen to trace Sammy's search for the iPhone.

Attachment 7.4 Where's My iPhone?

6. Draw a circle ● where Sammy found his iPhone.
7. Name the area where the iPhone was located.
8. Sammy then caught the nearest bus home.
What coordinates describe the location of the nearest bus stop?
9. His friends walked through the *Parklands* near the University. Name any two sets of coordinates that could describe the location of these parklands.
10. Place a hospital 🏥 on Flinders Street and a skate park 🛹 near the River Torrens on the map.
11. Record their symbols and coordinates in the KEY.
12. Sammy's friend Gerry was running late. He sent him an SMS.
It said, "I am walking along $x + y = 9$ ".
How could you represent this on the map?
13. Name 2 buildings where Gerry could meet the friends if they travelled along this path.
14. Sammy walked from (0, 0) to the corner of Pirie and King William Streets. He sent this as a linear equation to Gerry. What did he send?
15. You have been asked to set a course for a treasure hunt between the skate park and the hospital. You need to place checkpoints at 2 or more locations. Use coordinates to describe your treasure hunt course and the location of the checkpoints.

7.1. NUMBER PROPERTIES

Number properties	3, 16, -8, 225
Factors	3, 16, -8, 225,
Multiplies	3, 16, -8, 225,
Prime	3,
composite	16, -8, 225,
Positive	3, 16, 225,
negative	-8,
Square numbers	16, 225,
Square roots	3, 16, -8, 225,

Is there one number that can be placed in all of these categories? Explain your answer. No. Simplest answer refers to positive/negative numbers.

Order the numbers 225, 3, 16, -8 from smallest to largest by placing them on an open number line.

-8 0 3 16

225

What are the prime factors of-

25 5, 5, (or 5x5)

24 2, 2, 2, 3,

225 3, 3, 5, 5,

Kym and Jade's teacher presented the class with the following problem-

$$6+4x3-20$$

Kym said the answer was -2

Jade said the answer was 10

Is either correct? Explain your thinking.

Kym's answer (-2) is correct.

BEDMAS

Brackets first, Multiplication, Addition, Subtraction

$$6+(4 \times 3)-20 = 6+12-20 = 18-20 = -2$$

Which of these locations has the larger temperature range?

Canberra Low minus 10.0°C
High 42.2°C

Mt Kosciusko Low minus 23.9°C
High 33.3°C

Mt Kosciusko has larger temperature range: minus 23 to 33 is 56 degrees.

Canberra's range is 52.2 degrees.

Students could include a number line or calculation to show their thinking.

7.2 FRACTIONS, DECIMALS, PERCENTAGES

Age	Sleep needs	FRACTIONS	PERCENTAGE	DECIMALS
Newborns	? hours	$\frac{18}{24}$	75%	0.75
Infants	15 hours	$\frac{15}{24}$	62.5%	0.625
Toddlers	14 hours	$\frac{14}{24}$	58.33%	$0.58\overline{(3)}$
Preschoolers	? hours	$\frac{12}{24}$	50%	0.5
School-age	11 hours	$\frac{11}{24}$	45.8%	$0.45\overline{(8)}$
Teens	9.5 hours	$\frac{19}{48}$	39.5%	$0.39\overline{(5)}$

What is the total for all the percentages across these ages? 331.13

Why is the answer more than 100%? Variety of answers – not percentage of one unit, percentages of several independent categories.

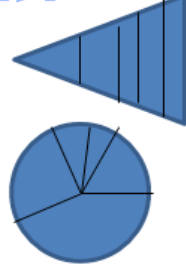
Estimate the percentage of time that you spend each school day engaged in the following activities:-

Sleeping At school

These should add up to 100%

Draw a diagram / graph that best represents this information

Representation of 100% divided into %
Variety of ways these % could be represented

**7.3 PATTERNS and ALGEBRA**

1) 3, 12, 19, 45, 63.5 2) 0, 3, 9, 21, 30 3) 50, 60, 85, 30, 55.5 4) 4, 6, 8, 10, 12

$$y = x - 4$$

$$n = 3m$$

Jordan has the correct answer - 43

Understands that $8x$ means 8 times x

7.4 Where's My iPhone

1) (4, 4.5) or (4, 5) 2) Grenfell and Frome 3) (3, 2) or (2.5, 2) 4) (4, 8) 5) Rundle, Frome, East Tce, North Tce

Check map for path to find the iPhone. Circle marks the spot.

7) University of Adelaide 8) (5.5, 5.5) 9) Answers may include (8, 7) (9, 7) (8, 8) (9, 8) (7, 6) (8, 6)

10) + 11) see map 12) straight line drawn from (0, 9) to (9, 0) 13) cinema, ATM on Pirie Street

14) I am travelling on $x = y$ (or $y = x$) 15) answers on map and as a written description; will vary