PORTSMOUTH SECONDARY SCHOOL

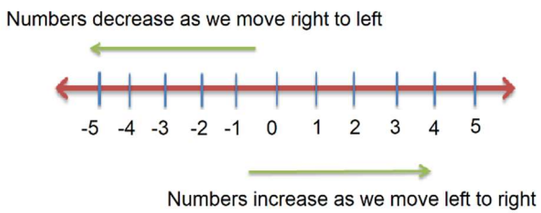
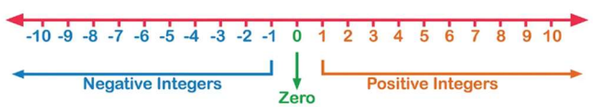
MATHEMATICS DEPARTMENT

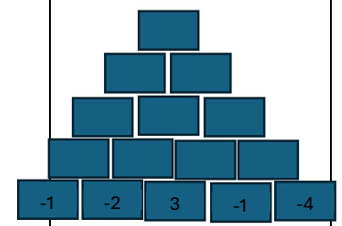
FORM ONE (1) UNIT

TERM 1

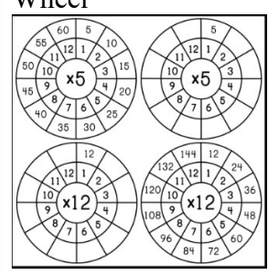
AY 2025 – 2026

Unit

DATE	SPECIFIC OBJECTIVES	CONTENT	ACTIVITIES	STRATEGIES	MATERIALS	EVALUATION
Wk 1	NUMBER Integers At the end of this unit, students should be able to: 1) Define (a) integers and (b) negative numbers 2) Represent negative numbers on a number line 3) Order Integers 4) Compare Integers	• Integers are all positive and negative whole numbers • Numbers less than zero are called negative numbers. • Negative numbers are symbolized by a minus or a dash (-) sign in front of a number • A number line is a straight line, with marks at equal distances along it  • Ascending order: from least to greatest Descending order: from greatest to least • Numbers to the right of the number line are always larger than those on the left  	❖ Discuss the instances where negative numbers are used. ○ Temperature ○ Sports/goal differences ○ Banking/ overdraft ○ Time ❖ Randomly selected students will identify all the negative values ○ -16, 7, 13, -10, 12, -16 ❖ Write numbers in order of size; smallest to largest and vice versa. ❖ Lucky Dip: a group of numbers placed in a bag. 2 students individually dip. Students with the number greater in value receives a token.	Videos -YouTube https://www.youtube.com/watch?v=7xV0tu4Qr4k http://www.youtube.com/watch?v=qKOojMSCkTA Handouts with worked examples Visual representation of number lines – handouts Demonstration	Text – Math Connect Thermometer A thermometer is a number line that depicts temperature and often uses a vertical number line rather than horizontal. When reading a thermometer: Zero represents 0°C plus temperatures are above zero, eg 8°C counting upwards as the temperature gets warmer (positive numbers) minus temperatures are below zero, eg – 4°C counting downwards as the temperature gets colder (negative numbers) Prepared Questions	Write each set of numbers in order of size, smallest first (a) 4, -2, -3 (b) 0, -3, 5, -2, 4 (c) -8, -10, -4, -3, -6, 5 What type of numbers are represented on the left side of the number line? Find out more about negative numbers are used in everyday life. Copy and complete by filling in the sign < or > (a) -5 _____ 5 (b) 4 _____ -16 (c) -6 _____ -11 Homework

		"-" is the negative sign. "+" is the positive sign Greater than > Less than <				
Wk 2/3	5) Add and subtract integers - with the use of number lines 6) Add and subtract integers - without the use of number lines	Using a number line • When adding a positive number, move to the right, the number of spaces added. • When subtracting a positive number, move to the left, the number of spaces subtracted. • When adding a negative number, move to the left, the number of spaces being added • When subtracting a negative number, move to the right the number of spaces being subtracted. This is the same as adding a positive number. • Rules OPERATIONS ON POSITIVE AND NEGATIVE NUMBERS Addition	❖ Students will create their own questions and allow their peers to find the answer. ❖ Students will use the printed number lines to solve questions in groups ❖ Students will be placed in groups according to their rows. Each group will be assigned a different strategy to solve the same question Each group will solve questions using their particular strategy and present to the class	Discussion Illustration/ Modeling Ballons and Weights Strategy https://www.mathsisfun.com/positive-negative-integers.html Borrow/Owing Strategy Negative Numbers (borrow/owe) Positive Number (pay back) Weight/Scale Strategy This little can be used to remember addition and subtraction of negative numbers: Same sign add and keep, different sign subtract, and take the sign with the highest number and you will be exact	Text Prepared Questions Flash cards Text – Maths Connect 2 Resource Material/ Worksheets (1c, 2c, 5c, 10c, 25c, $1 coins) Scale	Use a number line to represent the following questions and solve: (a) 5 + (-3) = (b) 8 – (-7) = (c) -2 + 9 = (d) -9 – (-1) = Solve the following without the use of number lines: (a) 4 + (-6) = (b) 5 – (-1) = (c) -1 + 12 = (d) -8 – (-5) = Complete the diagram using the rules to add and subtract integers: 

		Positive + Positive = Positive 5 + 5 = 8 Negative + Negative = Negative (-5) + (-3) = -8 Positive + Negative or Negative + Positive o Subtract the smaller number from the larger number, then use the sign of the larger number in the answer. 3 + (-5) = -2 Subtraction Negative – Positive = Negative Positive – Negative = Positive Negative – Negative = Negative + Positive • Treat as Negative + Positive • Subtract the smaller number from the larger number, then use the sign of the larger number in the answer ✓ Two unlike signs becomes a negative sign +(+) becomes + -(-) becomes - ✓ Two like signs becomes a positive sign	Groups will compare answers ❖ Students will be randomly selected to solve questions board without the use of number lines ❖ Case Runner https://www.mathsis			
Wk 3/4	7) Multiply and divide integers 8)	Multiplication Positive x Positive = Positive Negative x Negative = Positive Negative x Positive = Negative Positive x Negative = Negative Division Positive x Positive = Positive Negative x Negative = Positive Negative x Positive = Negative Positive x Negative = Negative When reading a thermometer, zero represents 0°C, Plus temperatures are above zero, eg 8°C, counting	Story Time Why does multiplying two negative numbers make a positive? Well, first there is the "common sense" explanation. When I say "Eat!" I am encouraging you to eat (positive) But when I say "Do not eat!" I am saying the oppositive (negative).	YouTube videos Hand out of rules to staple in exercise books. Charts Demonstration	Devices Texts Google Classroom Worksheets Thermometer Cold Water Hot Water	Without the use of number lines, solve: (a) 3 X -5 = (b) -2 X -9 = (c) -12 / 4 = (d) -24 / -8 = Homework What about multiplying 3 or more numbers together? What is (-2) X (-3) X (-4)?

		upwards as the temperature gets warmer (positive numbers) Minus temperatures are below zero, eg -4°C counting downwards as the temperature gets colder (negative numbers)	Now if I say "Do NOT not eat!", I am saying I don't want you to starve, so I am back to saying "Eat!" (positive) So, two negatives make a positive, and if that satisfies you, then you don't need to read any more. Students will formulate examples of their own and share with the class. Solving of questions that involve our everyday life.			Multiply two at a time and follow the rules. In London, the temperature is -3°C, on a Monday. The next day it rose by 7°C. What was the temperature on Tuesday?
Wk 5	9) Plot coordinates 10) State Coordinates of points	• Cartesian Plane Vertical number line -by y-axis Horizontal number line – x-axis Point of intersection – Center (0, 0)	• Students will be able given a set of coordinates to plot on graph paper. Students will join the points in a particular order to create different shapes and objects	Videos – using negative numbers in coordinates as a pilot Demonstration	Grid board	Plot the following points and join them in alphabetical order A(-4, -8), B(-3, -9), C(-2, -8), D(-2, 0), E(-5, 0), F(-6, 4), G(-2, 5), H(2, 4), I(5, 0), then join I to A.
Wk 6	11) Use Basic Arithmetic Operation 12) Understand the concept of: (a) Identity for Addition and Multiplication (b) Inverse for numbers under addition	Basic Operation (Addition, Subtraction, Multiplication, Division) • The identity for an operation leaves the original number unchanged (the same) • If zero (0) is added to a number, the number remains the same. Therefore, zero is the identity for addition. • If a number is multiplied by one (1), the number remains the same. Therefore, one, is the identity for addition. • The inverse of a number combines with this number to give the identity, zero. The	• Students will create a Math Wheel of Arithmetic Operations using: (a) Identity for addition (b) Identity for multiplication (c) Inverse for numbers under addition (d) Multiplication by zero	Discussion Peer Tutoring Worked examples of concepts	Text Book pg. 16 Colored pencils Crayons Math Wheel material	Complete Math Wheel for Homeowork Example of Math Wheel 

	(c) Inverse for numbers under multiplication (d) Multiply by zero (e) Understand the concept of division by zero	inverse of a number also bears the opposite sign at the front of the number. Eg. The inverse of 3 under addition is -3 3 + (-3) = 0 The inverse of -5 under addition is 5. -5 + 5 = 0 • The inverse of a number combines with the number to give the identity, one. The inverse of a number is that number written as a fraction with one as the numerator. Eg. The inverse of 6 under multiplication is $^1/_6$ 6 x $^1/_6$ = 1 The inverse of -5 under multiplication is $^1/_{-5}$ or $-^1/_5$. Please note that the negative sign is placed at the front of the fraction. • If a number is multiplied by zero then the product is zero (0) • Any number divided by zero is undefined	(e) Dividing by zero			Classwork Homework #2 Research other mathematics rules/laws
Wk 7	13) Recall the commutative, associative and distributive laws	• Commutative Law – deals with the order in which the operation is performed. Your answer remains the same regardless of the position of the number Addition and Multiplication are commutative. Subtraction and Division are non-commutative • Associative Law – deals with grouping of numbers. Your answer remains the same regardless of where brackets are placed. Addition and Multiplication are associative.	❖ Students will be placed in groups and discuss the differences between terms. ❖ Students will perform basic operations using different laws ❖ Students will recall the squaring. ❖ Students will use this concept to demonstrate on board the	Guide students in differentiating between the different laws. Group discussions Questioning Discussion	Devices to access Google Classroom Live worksheet. Text pg. 18 Text Worksheets	1. Why are division and subtraction not commutative 2. Is subtraction associative? Explain why or why not. 3. What is the inverse operation of multiplication ? Give an example to

<table>
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<td></td>
<td>14) Solve problems using power/exponents</td>
<td>Subtraction and Division are non-associative.

• Distributive Law – deals with multiplication of numbers in brackets. The number outside the bracket is multiplied by every number inside the brackets
• The power/index indicates how many times we multiply the base
2^4 – the base is 2 and the power is 4
Therefore $2^4 = 2 \times 2 \times 2 \times 2 = 16$

• Any number raised to 1 is itself
$3^1 = 3$
• Any number raised to the zero power is equal to 1
$6^0 = 1$
• When multiplying numbers of the same base, add the power
$2^4 \times 2^3 = 2^7$
• When dividing numbers of the same base, subtract the powers
• $6^5 / 6^3 = 6^2$</td>
<td>expansion of numbers raised to different powers</td>
<td></td>
<td></td>
<td>explain your answer.

Quiz
Solve the following:
$6^3 =$
$2^3 - 2^1 =$
$5^6 / 5^4 =$
$7^0 =$
$4^4 \times 4^3 =$

Test: 12 Multiple Choice, Matching, 1 Structure</td>
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<tr>
<td>Wk 8</td>
<td>15) Understand and use the Decimal System (Base 10)</td>
<td>• In the decimal system (denary system), we count in base 10 and use the 10 digits 0 – 9. This is the number system we use today on a regular bases
• Each digit of a number has a place value in terms of powers of 10.

983275 is the same as 983275_{10}
<table>
<tr><td>Place Value</td><td>Hun. Thous</td><td>Ten Thous</td><td>Thous</td><td>Hun</td><td>Tns</td><td>One</td></tr>
</table>
</td>
<td>❖ Students will use the place value chart and write numbers in expanded form in Base 10
❖ Discuss the importance of the decimal system</td>
<td>Demonstration

Use of place value chart</td>
<td>Text

Place value Chart</td>
<td>Represent each of the following binary numbers using place values which are powers of 2.

(a) 1011_2
(b) 111_2
(c) 11001_2</td>
</tr>
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	16) (a) Understand and use the Binary System (Base 2)	<table><tr><td>Place Value</td><td>$10000 = 10^5$</td><td>$1000 = 10^4$</td><td>$1000 = 10^3$</td><td>$100 = 10^2$</td><td>$10 = 10^1$</td><td>$1 = 10^0$</td></tr><tr><td>Digit</td><td>9</td><td>8</td><td>3</td><td>2</td><td>7</td><td>5</td></tr><tr><td></td><td>$9 \times 10^5 = 900000$</td><td>$8 \times 10^4 = 80000$</td><td>$3 \times 10^3 = 3000$</td><td>$2 \times 10^2 = 200$</td><td>$7 \times 10^1 = 70$</td><td>$5 \times 10^0 = 5$</td></tr></table> See text for additional place values (extension of chart) • In the binary system (bicimal system), we count in base 2 and use only TWO digits 0 and 1. • Each digit of a number has a place value in terms of powers of 2. 111001_2 <table><tr><td>Place Value</td><td>$2^5 = 32$</td><td>$2^4 = 16$</td><td>$2^3 = 8$</td><td>$2^2 = 4$</td><td>$2^1 = 2$</td><td>$2^0 = 1$</td></tr><tr><td>Digit</td><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>1</td></tr><tr><td></td><td>$1 \times 2^5 = 32$</td><td>$1 \times 2^4 = 16$</td><td>$1 \times 2^3 = 8$</td><td>$0 \times 2^2 = 0$</td><td>$0 \times 2^1 = 0$</td><td>$1 \times 2^0 = 1$</td></tr></table> • Converting to base 10 is adding all the products. 32 + 16 + 8 + 0 + 0 + 1 = 57 Therefore, 111001_2 converted to base two is 57_{10} or 57		Questioning	Video: https://www.youtube.com/watch?v=pPaTL37Yx_I	Convert the following to a denary number: (a) 1011_2 (b) 111_2 (c) 1101_2