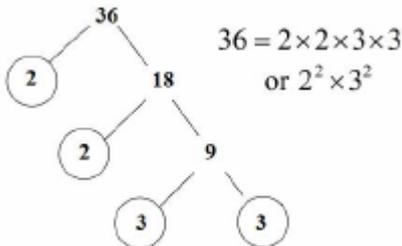


Topic/Skill	Definition/Tips	Example
1. Integer	A whole number that can be positive, negative or zero.	$-3, 0, 92$
2. Decimal	A number with a decimal point in it. Can be positive or negative.	$3.7, 0.94, -24.07$
3. Negative Number	A number that is less than zero . Can be decimals.	$-8, -2.5$
4. Addition	To find the total , or sum , of two or more numbers. 'add', 'plus', 'sum'	$3 + 2 + 7 = 12$
5. Subtraction	To find the difference between two numbers. To find out how many are left when some are taken away. 'minus', 'take away', 'subtract'	$10 - 3 = 7$
6. Multiplication	Can be thought of as repeated addition . 'multiply', 'times', 'product'	$3 \times 6 = 6 + 6 + 6 = 18$
7. Division	Splitting into equal parts or groups. The process of calculating the number of times one number is contained within another one . 'divide', 'share'	$20 \div 4 = 5$ $\frac{20}{4} = 5$
8. Remainder	The amount ' left over ' after dividing one integer by another.	The remainder of $20 \div 6$ is 2, because 6 divides into 20 exactly 3 times, with 2 left over.
9. BIDMAS	An acronym for the order you should do calculations in. BIDMAS stands for ' Brackets, Indices, Division, Multiplication, Addition and Subtraction '. Indices are also known as 'powers' or 'orders'. With strings of division and multiplication, or strings of addition and subtraction, and no brackets, work from left to right.	$6 + 3 \times 5 = 21, \text{not } 45$ $5^2 = 25$, where the 2 is the index/power. $12 \div 4 \div 2 = 1.5, \text{not } 6$

Topic/Skill	Definition/Tips	Example
1. Multiple	The result of multiplying a number by an integer. The times tables of a number.	The first five multiples of 7 are: 7, 14, 21, 28, 35
2. Factor	A number that divides exactly into another number without a remainder. It is useful to write factors in pairs	The factors of 18 are: 1, 2, 3, 6, 9, 18 The factor pairs of 18 are: 1, 18 2, 9 3, 6
3. Lowest Common Multiple (LCM)	The smallest number that is in the times tables of each of the numbers given.	The LCM of 3, 4 and 5 is 60 because it is the smallest number in the 3, 4 and 5 times tables.
4. Highest Common Factor (HCF)	The biggest number that divides exactly into two or more numbers.	The HCF of 6 and 9 is 3 because it is the biggest number that divides into 6 and 9 exactly.
5. Prime Number	A number with exactly two factors . A number that can only be divided by itself and one. The number 1 is not prime , as it only has one factor, not two.	The first ten prime numbers are: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29
6. Prime Factor	A factor which is a prime number.	The prime factors of 18 are: 2, 3
7. Product of Prime Factors	Finding out which prime numbers multiply together to make the original number. Use a prime factor tree . Also known as 'prime factorisation'.	 $36 = 2 \times 2 \times 3 \times 3$ or $2^2 \times 3^2$
1. Place Value	The value of where a digit is within a number.	In 726, the value of the 2 is 20, as it is in the 'tens' column.
2. Place Value Columns	The names of the columns that determine the value of each digit . The 'ones' column is also known as the 'units' column.	 PLACE VALUE CHART
3. Rounding	To make a number simpler but keep its value close to what it was. If the digit to the right of the rounding digit is less than 5, round down . If the digit to the right of the rounding digit is 5 or more, round up .	74 rounded to the nearest ten is 70, because 74 is closer to 70 than 80. 152,879 rounded to the nearest thousand is 153,000.

Topic/Skill	Definition/Tips	Example
1. Decimal Place	The position of a digit to the right of a decimal point .	In the number 0.372, the 7 is in the second decimal place. 0.372 rounded to two decimal places is 0.37, because the 2 tells us to round down. Careful with money - don't write £27.4, instead write £27.40
2. Significant Figure	The significant figures of a number are the digits which carry meaning (ie. are significant) to the size of the number. The first significant figure of a number cannot be zero . In a number with a decimal, trailing zeros are not significant.	In the number 0.00821, the first significant figure is the 8. In the number 2.740, the 0 is not a significant figure. 0.00821 rounded to 2 significant figures is 0.0082. 19357 rounded to 3 significant figures is 19400. We need to include the two zeros at the end to keep the digits in the same place value columns.
3. Truncation	A method of approximating a decimal number by dropping all decimal places past a certain point without rounding .	3.14159265... can be truncated to 3.1415 (note that if it had been rounded, it would become 3.1416)
4. Error Interval	A range of values that a number could have taken before being rounded or truncated. An error interval is written using inequalities, with a lower bound and an upper bound . Note that the lower bound inequality can be 'equal to', but the upper bound cannot be 'equal to'.	0.6 has been rounded to 1 decimal place. The error interval is: $0.55 \leq x < 0.65$ The lower bound is 0.55 The upper bound is 0.65
5. Estimate	To find something close to the correct answer .	An estimate for the height of a man is 1.8 metres.
6. Approximation	When using approximations to estimate the solution to a calculation, round each number in the calculation to 1 significant figure . \approx means 'approximately equal to'	$\frac{348 + 692}{0.526} \approx \frac{300 + 700}{0.5} = 2000$ 'Note that dividing by 0.5 is the same as multiplying by 2'

Topic/Skill	Definition/Tips	Example
1. Fraction	A mathematical expression representing the division of one integer by another. Fractions are written as two numbers separated by a horizontal line .	$\frac{2}{7}$ is a 'proper' fraction. $\frac{9}{4}$ is an 'improper' or 'top-heavy' fraction.
2. Numerator	The top number of a fraction.	In the fraction $\frac{3}{5}$, 3 is the numerator.
3. Denominator	The bottom number of a fraction.	In the fraction $\frac{3}{5}$, 5 is the denominator.
4. Unit Fraction	A fraction where the numerator is one and the denominator is a positive integer.	$\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$ etc. are examples of unit fractions.
5. Reciprocal	The reciprocal of a number is 1 divided by the number . The reciprocal of x is $\frac{1}{x}$ When we multiply a number by its reciprocal we get 1. This is called the 'multiplicative inverse'.	The reciprocal of 5 is $\frac{1}{5}$ The reciprocal of $\frac{2}{3}$ is $\frac{3}{2}$, because $\frac{2}{3} \times \frac{3}{2} = 1$
6. Mixed Number	A number formed of both an integer part and a fraction part .	$3\frac{2}{5}$ is an example of a mixed number.
7. Simplifying Fractions	Divide the numerator and denominator by the highest common factor.	$\frac{20}{45} = \frac{4}{9}$
8. Equivalent Fractions	Fractions which represent the same value .	$\frac{2}{5} = \frac{4}{10} = \frac{20}{50} = \frac{60}{150} \text{ etc.}$
9. Comparing Fractions	To compare fractions, they each need to be rewritten so that they have a common denominator . Ascending means smallest to biggest . Descending means biggest to smallest .	Put in to ascending order : $\frac{3}{4}, \frac{2}{3}, \frac{5}{6}, \frac{1}{2}$. Equivalent: $\frac{9}{12}, \frac{8}{12}, \frac{10}{12}, \frac{6}{12}$ Correct order: $\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{5}{6}$

Maths Knowledge Organisers 7.4

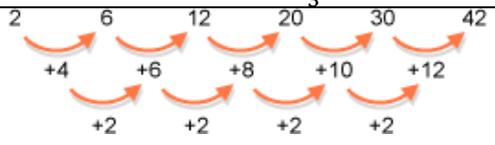
10. Fraction of an Amount	Divide by the bottom , times by the top	Find $\frac{2}{5}$ of £60 $60 \div 5 = 12$ $12 \times 2 = 24$
11. Adding or Subtracting Fractions	Find the LCM of the denominators to find a common denominator. Use equivalent fractions to change each fraction to the common denominator . Then just add or subtract the numerators and keep the denominator the same .	$\frac{2}{3} + \frac{4}{5}$ Multiples of 3: 3, 6, 9, 12, 15 .. Multiples of 5: 5, 10, 15 .. LCM of 3 and 5 = 15 $\frac{2}{3} = \frac{10}{15}$ $\frac{4}{5} = \frac{12}{15}$ $\frac{10}{15} + \frac{12}{15} = \frac{22}{15} = 1\frac{7}{15}$
12. Multiplying Fractions	Multiply the numerators together and multiply the denominators together.	$\frac{3}{8} \times \frac{2}{9} = \frac{6}{72} = \frac{1}{12}$
13. Dividing Fractions	'Keep it, Change it, Flip it, – KCF' Keep the first fraction the same Flip the second fraction upside down Change the divide to a multiply Multiply by the reciprocal of the second fraction.	$\frac{3}{4} \div \frac{5}{6} = \frac{3}{4} \times \frac{6}{5} = \frac{18}{20} = \frac{9}{10}$

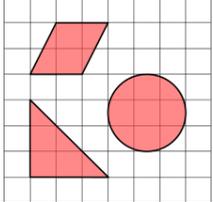
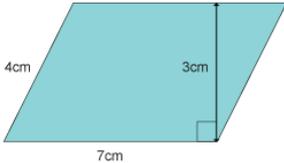
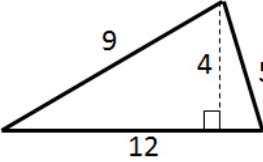
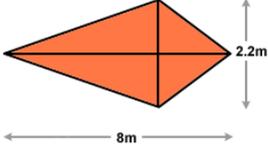
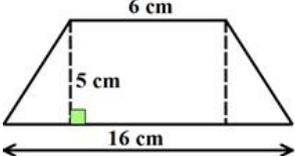
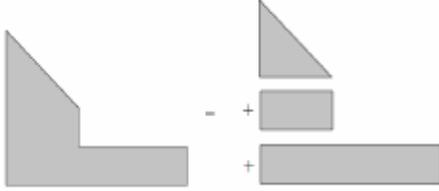
Topic/Skill	Definition/Tips	Example
1. Percentage	Number of parts per 100.	31% means $\frac{31}{100}$
2. Finding 10%	To find 10% , divide by 10	10% of £36 = $36 \div 10 = £3.60$
3. Finding 1%	To find 1% , divide by 100	1% of £8 = $8 \div 100 = £0.08$
4. Percentage Change	$\frac{\text{Difference}}{\text{Original}} \times 100\%$	A games console is bought for £200 and sold for £250. % change = $\frac{50}{200} \times 100 = 25\%$
5. Fractions to Decimals	Divide the numerator by the denominator using the bus stop method.	$\frac{3}{8} = 3 \div 8 = 0.375$
6. Decimals to Fractions	Write as a fraction over 10, 100 or 1000 and simplify.	$0.36 = \frac{36}{100} = \frac{9}{25}$
7. Percentages to Decimals	Divide by 100	$8\% = 8 \div 100 = 0.08$
8. Decimals to Percentages	Multiply by 100	$0.4 = 0.4 \times 100\% = 40\%$
9. Fractions to Percentages	Percentage is just a fraction out of 100. Make the denominator 100 using equivalent fractions. When the denominator doesn't go in to 100, use a calculator and multiply the fraction by 100.	$\frac{3}{25} = \frac{12}{100} = 12\%$ $\frac{9}{17} \times 100 = 52.9\%$
10. Percentages to Fractions	Percentage is just a fraction out of 100. Write the percentage over 100 and simplify.	$14\% = \frac{14}{100} = \frac{7}{50}$

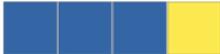
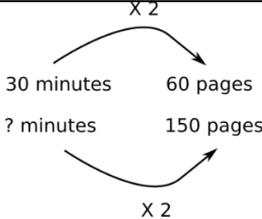
Topic/Skill	Definition/Tips	Example
1. Increase or Decrease by a Percentage	<p>Non-calculator: Find the percentage and add or subtract it from the original amount.</p> <p>Calculator: Find the percentage multiplier and multiply.</p>	<p><u>Increase 500 by 20% (Non Calc):</u> $10\% \text{ of } 500 = 50$ so $20\% \text{ of } 500 = 100$ $500 + 100 = 600$</p> <p><u>Decrease 800 by 17% (Calc):</u> $100\% - 17\% = 83\%$ $83\% \div 100 = 0.83$ $0.83 \times 800 = 664$</p>
2. Percentage Multiplier	The number you multiply a quantity by to increase or decrease it by a percentage .	<p>The multiplier for increasing by 12% is 1.12</p> <p>The multiplier for decreasing by 12% is 0.88</p> <p>The multiplier for increasing by 100% is 2.</p>
3. Reverse Percentage	<p>Find the correct percentage given in the question, then work backwards to find 100%</p> <p>Look out for words like 'before' or 'original'</p>	<p>A jumper was priced at £48.60 after a 10% reduction. Find its original price.</p> <p>$100\% - 10\% = 90\%$</p> <p>$90\% = £48.60$ $1\% = £0.54$ $100\% = £54$</p>
4. Simple Interest	Interest calculated as a percentage of the original amount.	<p>£1000 invested for 3 years at 10% simple interest.</p> <p>$10\% \text{ of } £1000 = £100$</p> <p>Interest = $3 \times £100 = £300$</p>

Topic/Skill	Definition/Tips	Example
1.Expression	A mathematical statement written using symbols, numbers or letters,	$3x + 2$ or $5y^2$
2. Equation	A statement showing that two expressions are equal	$2y - 17 = 15$
3. Identity	An equation that is true for all values of the variables An identity uses the symbol: \equiv	$2x \equiv x+x$
4. Formula	Shows the relationship between two or more variables	Area of a rectangle = length x width or $A = L \times W$
5. Simplifying Expressions	Collect 'like terms'. Be careful with negatives. x^2 and x are not like terms.	$2x + 3y + 4x - 5y + 3$ $= 6x - 2y + 3$ $3x + 4 - x^2 + 2x - 1 = 5x - x^2 + 3$
6. x times x	The answer is x^2 not $2x$.	Squaring is multiplying by itself, not by 2.
7. $p \times p \times p$	The answer is p^3 not $3p$	If $p=2$, then $p^3=2 \times 2 \times 2=8$, not $2 \times 3=6$
8. $p + p + p$	The answer is $3p$ not p^3	If $p=2$, then $2+2+2=6$, not $2^3 = 8$
9. Expand	To expand a bracket, multiply each term in the bracket by the expression outside the bracket.	$3(m + 7) = 3m + 21$
10. Factorise	The reverse of expanding . Factorising is writing an expression as a product of terms by 'taking out' a common factor .	$6x - 15 = 3(2x - 5)$, where 3 is the common factor.

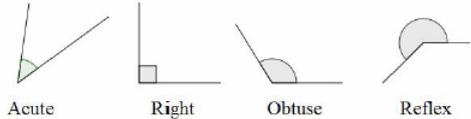
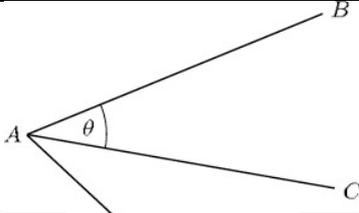
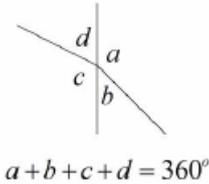
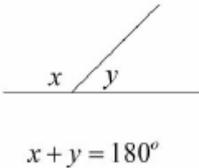
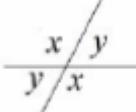
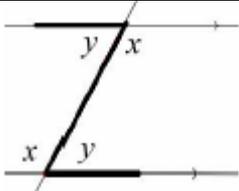
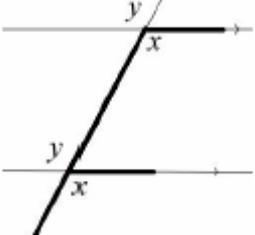
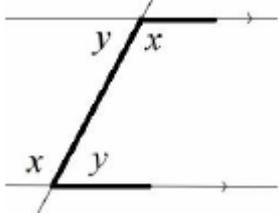
Topic/Skill	Definition/Tips	Example
1. Solve	To find the answer /value of something Use inverse operations on both sides of the equation (balancing method) until you find the value for the letter.	Solve $2x - 3 = 7$ Add 3 on both sides $2x = 10$ Divide by 2 on both sides $x = 5$
2. Inverse	Opposite	The inverse of addition is subtraction. The inverse of multiplication is division.
3. Rearranging Formulae	Use inverse operations on both sides of the formula (balancing method) until you find the expression for the letter.	Make x the subject of $y = \frac{2x-1}{z}$ Multiply both sides by z $yz = 2x - 1$ Add 1 to both sides $yz + 1 = 2x$ Divide by 2 on both sides $\frac{yz + 1}{2} = x$ We now have x as the subject.
4. Writing Formulae	Substitute letters for words in the question.	Bob charges £3 per window and a £5 call out charge. $C = 3N + 5$ Where N = number of windows and C = cost
5. Substitution	Replace letters with numbers. Be careful of $5x^2$. You need to square first, then multiply by 5.	$a = 3, b = 2$ and $c = 5$. Find: 1. $2a = 2 \times 3 = 6$ 2. $3a - 2b = 3 \times 3 - 2 \times 2 = 5$ 3. $7b^2 - 5 = 7 \times 2^2 - 5 = 23$

Topic/Skill	Definition/Tips	Example
1. Linear Sequence	A number pattern with a common difference .	2, 5, 8, 11... is a linear sequence
2. Term	Each value in a sequence is called a term.	In the sequence 2, 5, 8, 11..., 8 is the third term of the sequence.
3. Term-to-term rule	A rule which allows you to find the next term in a sequence if you know the previous term .	First term is 2. Term-to-term rule is 'add 3' Sequence is: 2, 5, 8, 11...
4. nth term	A rule which allows you to calculate the term that is in the nth position of the sequence. Also known as the 'position-to-term' rule. n refers to the position of a term in a sequence.	nth term is $3n - 1$ The 100 th term is $3 \times 100 - 1 = 299$
5. Finding the nth term of a linear sequence	1. Find the difference . 2. Multiply that by n . 3. Substitute $n = 1$ to find out what number you need to add or subtract to get the first number in the sequence .	Find the nth term of: 3, 7, 11, 15... 1. Difference is +4 2. Start with $4n$ 3. $4 \times 1 = 4$, so we need to subtract 1 to get 3. nth term = $4n - 1$
6. Fibonacci type sequences	A sequence where the next number is found by adding up the previous two terms	The Fibonacci sequence is: 1,1,2,3,5,8,13,21,34 ... An example of a Fibonacci-type sequence is: 4, 7, 11, 18, 29 ...
7. Geometric Sequence	A sequence of numbers where each term is found by multiplying the previous one by a number called the common ratio, r .	An example of a geometric sequence is: 2, 10, 50, 250 ... The common ratio is 5 Another example of a geometric sequence is: 81, -27, 9, -3, 1 ... The common ratio is $-\frac{1}{3}$
8. Quadratic Sequence	A sequence of numbers where the second difference is constant . A quadratic sequence will have a n^2 term.	

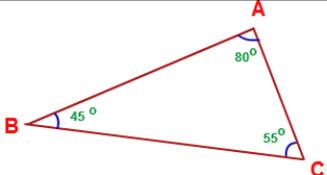
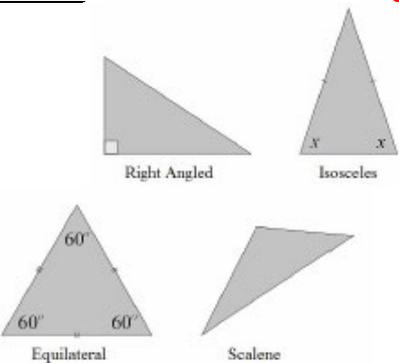
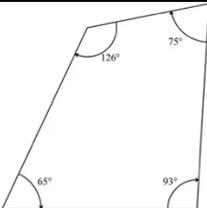
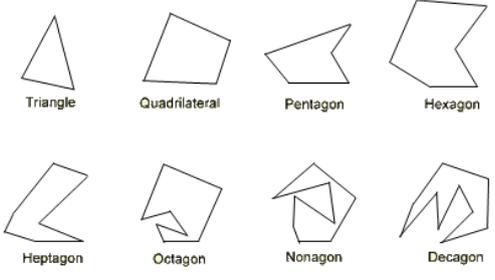
Topic/Skill	Definition/Tips	Example
1. Perimeter	The total distance around the outside of a shape. Units include: <i>mm, cm, m</i> etc.	 <p>$P = 8 + 5 + 8 + 5 = 26cm$</p>
2. Area	The amount of space inside a shape. Units include: mm^2, cm^2, m^2	
3. Area of a Rectangle	Length x Width	 <p>$A = 36cm^2$</p>
4. Area of a Parallelogram	Base x Perpendicular Height Not the slant height.	 <p>$A = 21cm^2$</p>
5. Area of a Triangle	Base x Height ÷ 2	 <p>$A = 24cm^2$</p>
6. Area of a Kite	Split in to two triangles and use the method above.	 <p>$A = 8.8m^2$</p>
7. Area of a Trapezium	$\frac{(a + b)}{2} \times h$ <p>“Half the sum of the parallel side, times the height between them. That is how you calculate the area of a trapezium”</p>	 <p>$A = 55cm^2$</p>
8. Compound Shape	A shape made up of a combination of other known shapes put together.	

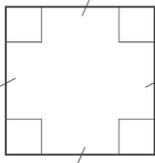
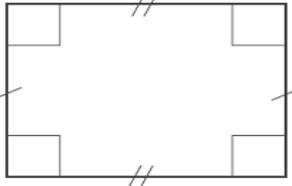
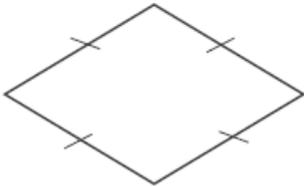
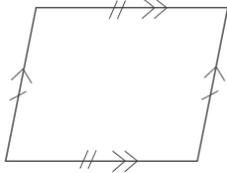
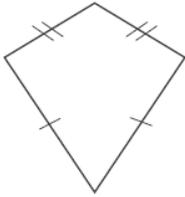
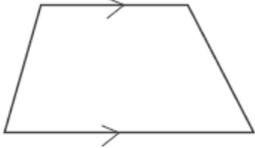
Topic/Skill	Definition/Tips	Example
1. Ratio	Ratio compares the size of one part to another part . Written using the ':' symbol.	$3 : 1$ 
2. Proportion	Proportion compares the size of one part to the size of the whole . Usually written as a fraction.	In a class with 13 boys and 9 girls, the proportion of boys is $\frac{13}{22}$ and the proportion of girls is $\frac{9}{22}$
3. Simplifying Ratios	Divide all parts of the ratio by a common factor .	$5 : 10 = 1 : 2$ (divide both by 5) $14 : 21 = 2 : 3$ (divide both by 7)
4. Ratios in the form $1 : n$ or $n : 1$	Divide both parts of the ratio by one of the numbers to make one part equal 1 .	$5 : 7 = 1 : \frac{7}{5}$ in the form $1 : n$ $5 : 7 = \frac{5}{7} : 1$ in the form $n : 1$
5. Sharing in a Ratio	1. Add the total parts of the ratio. 2. Divide the amount to be shared by this value to find the value of one part. 3. Multiply this value by each part of the ratio. Use only if you know the total .	Share £60 in the ratio 3 : 2 : 1. $3 + 2 + 1 = 6$ $60 \div 6 = 10$ $3 \times 10 = 30, 2 \times 10 = 20, 1 \times 10 = 10$ £30 : £20 : £10
6. Proportional Reasoning	Comparing two things using multiplicative reasoning and applying this to a new situation. Identify one multiplicative link and use this to find missing quantities.	
7. Unitary Method	Finding the value of a single unit and then finding the necessary value by multiplying the single unit value.	3 cakes require 450g of sugar to make. Find how much sugar is needed to make 5 cakes. $3 \text{ cakes} = 450\text{g}$ So $1 \text{ cake} = 150\text{g}$ (\div by 3) So $5 \text{ cakes} = 750\text{g}$ (\times by 5)
8. Ratio already shared	Find what one part of the ratio is worth using the unitary method .	Money was shared in the ratio 3:2:5 between Ann, Bob and Cat. Given that Bob had £16, found out the total amount of money shared. $\pounds 16 = 2 \text{ parts}$ So $\pounds 8 = 1 \text{ part}$ $3 + 2 + 5 = 10 \text{ parts}$, so $8 \times 10 = \pounds 80$
9. Best Buys	Find the unit cost by dividing the price by the quantity . The lowest number is the best value.	8 cakes for £1.28 \rightarrow 16p each (\div by 8) 13 cakes for £2.05 \rightarrow 15.8p each (\div by 13) Pack of 13 cakes is best value.

Topic/Skill	Definition/Tips	Example
1. Metric System	<p>A system of measures based on:</p> <ul style="list-style-type: none"> - the metre for length - the kilogram for mass - the second for time <p>Length: mm, cm, m, km Mass: mg, g, kg Volume: ml, cl, l</p>	<p><i>1 kilometre = 1000 metres</i> <i>1 metre = 100 centimetres</i> <i>1 centimetre = 10 millimetres</i></p> <p><i>1 kilogram = 1000 grams</i></p>
2. Imperial System	<p>A system of weights and measures originally developed in England, usually based on human quantities</p> <p>Length: inch, foot, yard, miles Mass: lb, ounce, stone Volume: pint, gallon</p>	<p><i>1 lb = 16 ounces</i> <i>1 foot = 12 inches</i> <i>1 gallon = 8 pints</i></p>
3. Metric and Imperial Units	<p>Use the unitary method to convert between metric and imperial units.</p>	<p><i>5 miles ≈ 8 kilometres</i> <i>1 gallon ≈ 4.5 litres</i> <i>2.2 pounds ≈ 1 kilogram</i> <i>1 inch = 2.5 centimetres</i></p>
4. Speed, Distance, Time	<p>Speed = Distance ÷ Time Distance = Speed x Time Time = Distance ÷ Speed</p> <div style="text-align: center;"> </div> <p>Remember the correct units.</p>	<p>Speed = 4mph Time = 2 hours</p> <p>Find the Distance.</p> <p>$D = S \times T = 4 \times 2 = 8 \text{ miles}$</p>
5. Density, Mass, Volume	<p>Density = Mass ÷ Volume Mass = Density x Volume Volume = Mass ÷ Density</p> <div style="text-align: center;"> </div> <p>Remember the correct units.</p>	<p>Density = 8kg/m³ Mass = 2000g</p> <p>Find the Volume.</p> <p>$V = M \div D = 2 \div 8 = 0.25m^3$</p>
6. Distance-Time Graphs	<p>You can find the speed from the gradient of the line (Distance ÷ Time) The steeper the line, the quicker the speed. A horizontal line means the object is not moving (stationary).</p>	

Topic/Skill	Definition/Tips	Example
1. Types of Angles	<p>Acute angles are less than 90°.</p> <p>Right angles are exactly 90°.</p> <p>Obtuse angles are greater than 90° but less than 180°.</p> <p>Reflex angles are greater than 180° but less than 360°.</p>	 <p>Acute Right Obtuse Reflex</p>
2. Angle Notation	<p>Can use one lower-case letters, eg. θ or x</p> <p>Can use three upper-case letters, eg. BAC</p>	
3. Angles at a Point	<p>Angles around a point add up to 360°.</p>	 <p>$a + b + c + d = 360^\circ$</p>
4. Angles on a Straight Line	<p>Angles around a point on a straight line add up to 180°.</p>	 <p>$x + y = 180^\circ$</p>
5. Opposite Angles	<p>Vertically opposite angles are equal.</p>	
6. Alternate Angles	<p>Alternate angles are equal.</p> <p>They look like Z angles, but never say this in the exam.</p>	
7. Corresponding Angles	<p>Corresponding angles are equal.</p> <p>They look like F angles, but never say this in the exam.</p>	
8. Co-Interior Angles	<p>Co-Interior angles add up to 180°.</p> <p>They look like C angles, but never say this in the exam.</p>	

Maths Knowledge Organisers 7.13

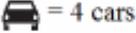
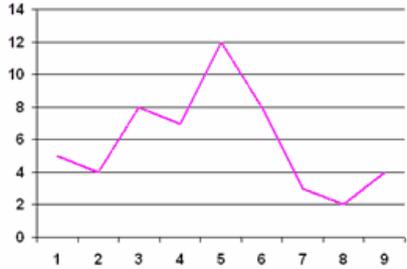
9. Angles in a Triangle	Angles in a triangle add up to 180°.	
10. Types of Triangles	<p>Right Angle Triangles have a 90° angle in.</p> <p>Isosceles Triangles have 2 equal sides and 2 equal base angles.</p> <p>Equilateral Triangles have 3 equal sides and 3 equal angles (60°).</p> <p>Scalene Triangles have different sides and different angles.</p> <p>Base angles in an isosceles triangle are equal.</p>	
11. Angles in a Quadrilateral	Angles in a quadrilateral add up to 360°.	
12. Polygon	A 2D shape with only straight edges .	Rectangle, Hexagon, Decagon, Kite etc.
13. Regular	A shape is regular if all the sides and all the angles are equal .	
14. Names of Polygons	<p>3-sided = Triangle</p> <p>4-sided = Quadrilateral</p> <p>5-sided = Pentagon</p> <p>6-sided = Hexagon</p> <p>7-sided = Heptagon/Septagon</p> <p>8-sided = Octagon</p> <p>9-sided = Nonagon</p> <p>10-sided = Decagon</p>	
15. Sum of Interior Angles	$(n - 2) \times 180$ where n is the number of sides.	Sum of Interior Angles in a Decagon = $(10 - 2) \times 180 = 1440^\circ$
16. Size of Interior Angle in a Regular Polygon	$\frac{(n - 2) \times 180}{n}$ <p>You can also use the formula: 180 – Size of Exterior Angle</p>	Size of Interior Angle in a Regular Pentagon = $\frac{(5 - 2) \times 180}{5} = 108^\circ$
17. Size of Exterior Angle in a Regular Polygon	$\frac{360}{n}$ <p>You can also use the formula: 180 – Size of Interior Angle</p>	Size of Exterior Angle in a Regular Octagon = $\frac{360}{8} = 45^\circ$

Topic/Skill	Definition/Tips	Example
1. Square	<ul style="list-style-type: none"> • Four equal sides • Four right angles • Opposite sides parallel • Diagonals bisect each other at right angles • Four lines of symmetry • Rotational symmetry of order four 	
2. Rectangle	<ul style="list-style-type: none"> • Two pairs of equal sides • Four right angles • Opposite sides parallel • Diagonals bisect each other, not at right angles • Two lines of symmetry • Rotational symmetry of order two 	
3. Rhombus	<ul style="list-style-type: none"> • Four equal sides • Diagonally opposite angles are equal • Opposite sides parallel • Diagonals bisect each other at right angles • Two lines of symmetry • Rotational symmetry of order two 	
4. Parallelogram	<ul style="list-style-type: none"> • Two pairs of equal sides • Diagonally opposite angles are equal • Opposite sides parallel • Diagonals bisect each other, not at right angles • No lines of symmetry • Rotational symmetry of order two 	
5. Kite	<ul style="list-style-type: none"> • Two pairs of adjacent sides of equal length • One pair of diagonally opposite angles are equal (where different length sides meet) • Diagonals intersect at right angles, but do not bisect • One line of symmetry • No rotational symmetry 	
6. Trapezium	<ul style="list-style-type: none"> • One pair of parallel sides • No lines of symmetry • No rotational symmetry <p>Special Case: Isosceles Trapeziums have one line of symmetry.</p>	

Topic/Skill	Definition/Tips	Example																				
1. Types of Data	<p>Qualitative Data – non-numerical data</p> <p>Quantitative Data – numerical data</p> <p>Continuous Data – data that can take any numerical value within a given range.</p> <p>Discrete Data – data that can take only specific values within a given range.</p>	<p>Qualitative Data – eye colour, gender etc.</p> <p>Continuous Data – weight, voltage etc.</p> <p>Discrete Data – number of children, shoe size etc.</p>																				
2. Grouped Data	<p>Data that has been bundled in to categories.</p> <p>Seen in grouped frequency tables, histograms, cumulative frequency etc.</p>	<table border="1"> <thead> <tr> <th>Foot length, l, (cm)</th> <th>Number of children</th> </tr> </thead> <tbody> <tr> <td>$10 \leq l < 12$</td> <td>5</td> </tr> <tr> <td>$12 \leq l < 17$</td> <td>53</td> </tr> </tbody> </table>	Foot length, l , (cm)	Number of children	$10 \leq l < 12$	5	$12 \leq l < 17$	53														
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3. Primary /Secondary Data	<p>Primary Data – collected yourself for a specific purpose.</p> <p>Secondary Data – collected by someone else for another purpose.</p>	<p>Primary Data – data collected by a student for their own research project.</p> <p>Secondary Data – Census data used to analyse link between education and earnings.</p>																				
4. Mean	<p>Add up the values and divide by how many values there are.</p>	<p>The mean of 3, 4, 7, 6, 0, 4, 6 is</p> $\frac{3 + 4 + 7 + 6 + 0 + 4 + 6}{7} = 5$																				
5. Mean from a Table	<ol style="list-style-type: none"> Find the midpoints (if necessary) Multiply Frequency by values or midpoints Add up these values Divide this total by the Total Frequency <p>If grouped data is used, the answer will be an estimate.</p>	<table border="1"> <thead> <tr> <th>Height in cm</th> <th>Frequency</th> <th>Midpoint</th> <th>F × M</th> </tr> </thead> <tbody> <tr> <td>$0 < h \leq 10$</td> <td>8</td> <td>5</td> <td>$8 \times 5 = 40$</td> </tr> <tr> <td>$10 < h \leq 30$</td> <td>10</td> <td>20</td> <td>$10 \times 20 = 200$</td> </tr> <tr> <td>$30 < h \leq 40$</td> <td>6</td> <td>35</td> <td>$6 \times 35 = 210$</td> </tr> <tr> <td>Total</td> <td>24</td> <td>Ignore!</td> <td>450</td> </tr> </tbody> </table> <p>Estimated Mean height: $450 \div 24 = 18.75\text{cm}$</p>	Height in cm	Frequency	Midpoint	F × M	$0 < h \leq 10$	8	5	$8 \times 5 = 40$	$10 < h \leq 30$	10	20	$10 \times 20 = 200$	$30 < h \leq 40$	6	35	$6 \times 35 = 210$	Total	24	Ignore!	450
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6. Median Value	<p>The middle value.</p> <p>Put the data in order and find the middle one.</p> <p>If there are two middle values, find the number half way between them by adding them together and dividing by 2.</p>	<p>Find the median of: 4, 5, 2, 3, 6, 7, 6</p> <p>Ordered: 2, 3, 4, 5, 6, 6, 7</p> <p>Median = 5</p>																				
7. Median from a Table	<p>Use the formula $\frac{(n+1)}{2}$ to find the position of the median.</p> <p>n is the total frequency.</p>	<p>If the total frequency is 15, the median will be the $\left(\frac{15+1}{2}\right) = 8\text{th}$ position</p>																				
8. Mode /Modal Value	<p>Most frequent/common.</p> <p>Can have more than one mode (called bi-modal or multi-modal) or no mode (if all values appear once)</p>	<p>Find the mode: 4, 5, 2, 3, 6, 4, 7, 8, 4</p> <p>Mode = 4</p>																				
9. Range	<p>Highest value subtract the Smallest value</p> <p>Range is a 'measure of spread'. The smaller the range the more <u>consistent</u> the data.</p>	<p>Find the range: 3, 31, 26, 102, 37, 97.</p> <p>Range = $102 - 3 = 99$</p>																				
10. Outlier	<p>A value that 'lies outside' most of the other values in a set of data.</p> <p>An outlier is much smaller or much larger than the other values in a set of data.</p>																					

Topic/Skill	Definition/Tips	Example																																						
1. Frequency Table	A record of how often each value in a set of data occurs .	<table border="1"> <thead> <tr> <th>Number of marks</th> <th>Tally marks</th> <th>Frequency</th> </tr> </thead> <tbody> <tr> <td>1</td> <td> </td> <td>7</td> </tr> <tr> <td>2</td> <td> </td> <td>5</td> </tr> <tr> <td>3</td> <td> </td> <td>6</td> </tr> <tr> <td>4</td> <td> </td> <td>5</td> </tr> <tr> <td>5</td> <td> </td> <td>3</td> </tr> <tr> <td>Total</td> <td></td> <td>26</td> </tr> </tbody> </table>	Number of marks	Tally marks	Frequency	1		7	2		5	3		6	4		5	5		3	Total		26																	
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2. Bar Chart	Represents data as vertical blocks. <i>x – axis</i> shows the type of data <i>y – axis</i> shows the frequency for each type of data Each bar should be the same width There should be gaps between each bar Remember to label each axis.	<table border="1"> <caption>Data for Bar Chart: Number of pets owned</caption> <thead> <tr> <th>Number of pets owned</th> <th>Frequency</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>3</td> </tr> <tr> <td>1</td> <td>8</td> </tr> <tr> <td>2</td> <td>12</td> </tr> <tr> <td>3</td> <td>1</td> </tr> <tr> <td>4</td> <td>2</td> </tr> </tbody> </table>	Number of pets owned	Frequency	0	3	1	8	2	12	3	1	4	2																										
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3. Types of Bar Chart	Compound/Composite Bar Charts show data stacked on top of each other. Comparative/Dual Bar Charts show data side by side.	<p>Compound Bar Chart Data:</p> <table border="1"> <thead> <tr> <th>Sample</th> <th>Aluminium (g)</th> <th>Carbon (g)</th> <th>Iron (g)</th> <th>Total (g)</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>25</td> <td>20</td> <td>15</td> <td>60</td> </tr> <tr> <td>B</td> <td>18</td> <td>15</td> <td>15</td> <td>48</td> </tr> <tr> <td>C</td> <td>28</td> <td>20</td> <td>22</td> <td>70</td> </tr> </tbody> </table> <p>Dual Bar Chart Data (Rainfall in cm):</p> <table border="1"> <thead> <tr> <th>Month</th> <th>London (cm)</th> <th>Bristol (cm)</th> </tr> </thead> <tbody> <tr> <td>Jan</td> <td>12</td> <td>15</td> </tr> <tr> <td>Feb</td> <td>18</td> <td>20</td> </tr> <tr> <td>Mar</td> <td>32</td> <td>35</td> </tr> <tr> <td>Apr</td> <td>42</td> <td>45</td> </tr> <tr> <td>May</td> <td>48</td> <td>50</td> </tr> </tbody> </table>	Sample	Aluminium (g)	Carbon (g)	Iron (g)	Total (g)	A	25	20	15	60	B	18	15	15	48	C	28	20	22	70	Month	London (cm)	Bristol (cm)	Jan	12	15	Feb	18	20	Mar	32	35	Apr	42	45	May	48	50
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4. Pie Chart	Used for showing how data breaks down into its constituent parts . When drawing a pie chart, divide 360° by the total frequency . This will tell you how many degrees to use for the frequency of each category. Remember to label the category that each sector in the pie chart represents.	<p>Pie Chart Data:</p> <table border="1"> <thead> <tr> <th>Sport</th> <th>Angle (degrees)</th> </tr> </thead> <tbody> <tr> <td>Football</td> <td>144°</td> </tr> <tr> <td>Netball</td> <td>80°</td> </tr> <tr> <td>Hockey</td> <td>60°</td> </tr> <tr> <td>Tennis</td> <td>40°</td> </tr> <tr> <td>Squash</td> <td>36°</td> </tr> </tbody> </table> <p>If there are 40 people in a survey, then each person will be worth $360 \div 40 = 9^\circ$ of the pie chart.</p>	Sport	Angle (degrees)	Football	144°	Netball	80°	Hockey	60°	Tennis	40°	Squash	36°																										
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5. Pictogram	<p>Uses pictures or symbols to show the value of the data.</p> <p>A pictogram must have a key.</p>	<p>Black </p> <p>Red </p> <p>Green   = 4 cars</p> <p>Others </p>																																																
6. Line Graph	<p>A graph that uses points connected by straight lines to show how data changes in values.</p> <p>This can be used for time series data, which is a series of data points spaced over uniform time intervals in time order.</p>																																																	
7. Two Way Tables	<p>A table that organises data around two categories.</p> <p>Fill out the information step by step using the information given.</p> <p>Make sure all the totals add up for all columns and rows.</p>	<p style="text-align: center;">Question: Complete the 2 way table below.</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>Left Handed</th> <th>Right Handed</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Boys</td> <td>10</td> <td></td> <td>58</td> </tr> <tr> <td>Girls</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Total</td> <td></td> <td>84</td> <td>100</td> </tr> </tbody> </table> <p style="text-align: center;">Answer: Step 1, fill out the easy parts (the totals)</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>Left Handed</th> <th>Right Handed</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Boys</td> <td>10</td> <td>48</td> <td>58</td> </tr> <tr> <td>Girls</td> <td></td> <td></td> <td>42</td> </tr> <tr> <td>Total</td> <td>10</td> <td>84</td> <td>100</td> </tr> </tbody> </table> <p style="text-align: center;">Answer: Step 2, fill out the remaining parts</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>Left Handed</th> <th>Right Handed</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Boys</td> <td>10</td> <td>48</td> <td>58</td> </tr> <tr> <td>Girls</td> <td>6</td> <td>36</td> <td>42</td> </tr> <tr> <td>Total</td> <td>16</td> <td>84</td> <td>100</td> </tr> </tbody> </table>		Left Handed	Right Handed	Total	Boys	10		58	Girls				Total		84	100		Left Handed	Right Handed	Total	Boys	10	48	58	Girls			42	Total	10	84	100		Left Handed	Right Handed	Total	Boys	10	48	58	Girls	6	36	42	Total	16	84	100
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Topic/Skill	Definition/Tips	Example
1. Probability	<p>The likelihood/chance of something happening.</p> <p>Is expressed as a number between 0 (impossible) and 1 (certain).</p> <p>Can be expressed as a fraction, decimal, percentage or in words (likely, unlikely, even chance etc.)</p>	
2. Probability Notation	P(A) refers to the probability that event A will occur .	P(Red Queen) refers to the probability of picking a Red Queen from a pack of cards.
3. Theoretical Probability	$\frac{\text{Number of Favourable Outcomes}}{\text{Total Number of Possible Outcomes}}$	Probability of rolling a 4 on a fair 6-sided die = $\frac{1}{6}$.
4. Relative Frequency	$\frac{\text{Number of Successful Trials}}{\text{Total Number of Trials}}$	A coin is flipped 50 times and lands on Tails 29 times. The relative frequency of getting Tails = $\frac{29}{50}$.
5. Expected Outcomes	To find the number of expected outcomes, multiply the probability by the number of trials .	The probability that a football team wins is 0.2 How many games would you expect them to win out of 40? $0.2 \times 40 = 8 \text{ games}$
6. Exhaustive	Outcomes are exhaustive if they cover the entire range of possible outcomes . The probabilities of an exhaustive set of outcomes adds up to 1 .	When rolling a six-sided die, the outcomes 1, 2, 3, 4, 5 and 6 are exhaustive, because they cover all the possible outcomes.
7. Mutually Exclusive	Events are mutually exclusive if they cannot happen at the same time . The probabilities of an exhaustive set of mutually exclusive events adds up to 1 .	Examples of mutually exclusive events: - Turning left and right - Heads and Tails on a coin Examples of non mutually exclusive events: - King and Hearts from a deck of cards, because you can pick the King of Hearts
8. Frequency Tree	A diagram showing how information is categorised into various categories. The numbers at the ends of branches tells us how often something happened (frequency). The lines connected the numbers are called branches .	