

Mid Key Stage 3 Maths - Topic List

Paper 1 - Calculator (50 marks):



<u>Topic</u>	<u>Marks available</u>
Types of number	8
Use of a calculator	6
Algebra skills - solving, simplifying, substitution, expanding	12
Properties of 2D shapes	2
Area and Perimeter	10
Sequences	5
Representing data - bar charts, pie charts	4
Use of parallel line facts to find missing angles.	3

Paper 2 - Non-Calculator (50 marks):

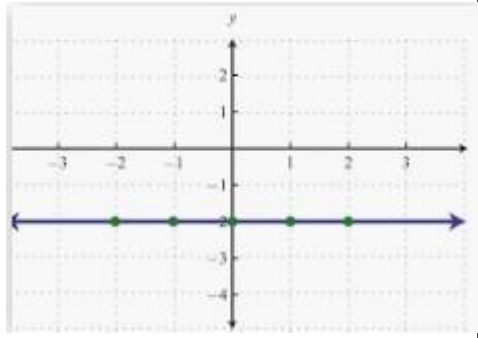
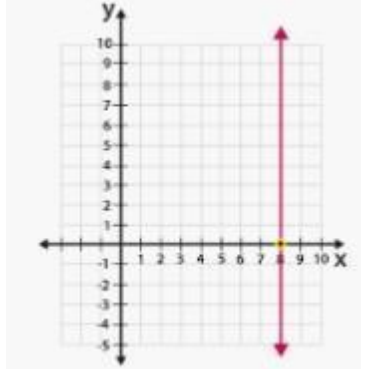
<u>Topic</u>	<u>Marks available</u>
Place Value and rounding	8
Written calculations - four operations	10
Calculations using the four operations with fractions	7
Order of Operations	4
Calculating a fraction or percentage of an amount	10
Coordinates and simple straight lines	3
Calculating missing angles on straight lines, around a point and in triangles.	5
Algebra skills - solving, simplifying, substitution, expanding	3

Please see following pages for knowledge organisers for each of the key topics on the assessment.


Addition and Subtraction

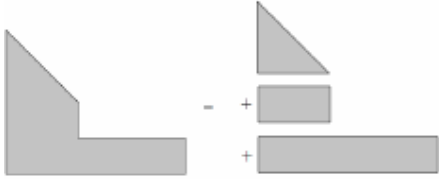
Topic/Skill	Definition/Tips	Example
1. Addition	... where a group of values are added together to find the overall total.	
2. Addition: - Key words	"total", "sum", "combined", "plus", "altogether", "how many", "increase"	<p>Find the total of 45, 62 and 35 ... $45 + 62 + 35 = 142$</p> <p>Increase 85 by 192 ... $85 + 192 = 277$</p>
3. Subtraction	... where a group of values are subtracted together to find how many remain.	
4. Subtraction: - Key words	"difference", "minus", "less than", "decrease", "reduce", "deduct"	<p>Deduct 85 from 193 $193 - 85 = 108$</p> <p>What is the difference of 820 and 190? $820 - 190 = 630$</p>
5. Integer	... meaning the value used has to be a whole number.	<p>Integer - 8, 10, 50, 140, 940 [... any whole number]</p>
6. Decimal	... meaning the value is not whole or complete and uses a decimal point.	<p>Decimal - 1.5, 10.2, 17.84, 0.412 [... any number using a decimal point]</p>
7. Financial Addition	... where a total is required using a given currency. On bank statements, the term 'credit' is used when money is paid into an account.	<p>he total of £1.05, £2.10 and £4.26 $1.05 + 2.10 + 4.26 = £7.41$</p>
8. Financial Subtraction	... where a total is required using a given currency. On bank statements, the term 'debit' is used when money is paid out of an account.	<p>Jack pays £4.80 with a £10 note. How much change does he get? $10.00 - 4.80 = £5.20$</p>

Coordinates

Topic/Skill	Definition/Tips	Example
1. Coordinates	Written in pairs . The first term is the x-coordinate (movement across). The second term is the y-coordinate (movement up or down)	A: (4, 7) B: (-6, -3)
2. Horizontal lines	Horizontal lines show a line where ever co-ordinate has the same y value. The way to remember which is which: Horizontal shows the Horizon These lines must cut the y axis.	Graph for $y = -2$ 
3. Vertical lines	Vertical lines show a line where ever co-ordinate has the same x value. The way to remember which is which: Vertical shows Vertigo (Fear of Heights) These lines must cut the x axis.	Graph for $x = 8$ 

Perimeter

Topic/Skill	Definition/Tips	Example
1. Perimeter	The total distance around the outside of a shape. Units include: cm, m, km etc.	<p style="text-align: center;">8 cm</p>  <p style="text-align: center;">5 cm</p> <p>Perimeter = $8 + 5 + 8 + 5 = 26\text{cm}$</p>

2. Compound Shape	A shape made up of a combination of other known shapes put together.	
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Place Value

Topic/Skill	Definition/Tips	Example														
1. Digit	Any of the ten numbers 0, 1, 2, 3, 4, 5, 6, 7, 8, 9	The number 23,452 has five digits														
2. Place Value	The value of a digit depending on its position.	<p>The numbers 432, 24, 2 004 all have the number 2. The place value of 2 is different</p> <p>432 the value is 2 as it is the ones column</p> <p>24 the value is 20 as it is in the tens column</p> <p>2,004 the value is 2000 as it is in the thousands column</p>														
3. Place Value Columns	<p>A chart or grid to show the place value of digits.</p> <p>As we move left, each position is 10 times bigger.</p>	<table border="1" data-bbox="772 1090 1505 1308"> <thead> <tr> <th>Millions</th> <th>Hundred Thousands</th> <th>Ten Thousands</th> <th>Thousands</th> <th>Hundreds</th> <th>tens</th> <th>Ones</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>4</td> <td>1</td> <td>3</td> <td>6</td> <td>2</td> <td>7</td> </tr> </tbody> </table> <p>Two million, four hundred and thirteen thousand, six hundred and twenty - seven</p>	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	tens	Ones	2	4	1	3	6	2	7
Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	tens	Ones										
2	4	1	3	6	2	7										
4. Read and write numbers	The place value columns helps us read and write numbers.	<table border="1" data-bbox="772 1435 1505 1603"> <thead> <tr> <th>Millions</th> <th>Hundred Thousands</th> <th>Ten Thousands</th> <th>Thousands</th> <th>Hundreds</th> <th>tens</th> <th>Ones</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td>3</td> <td>5</td> <td>2</td> <td>7</td> </tr> </tbody> </table> <p>number is made of 3,000 + 500 + 20 + 7</p> <p>Three thousand, five hundred and twenty-seven</p>	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	tens	Ones				3	5	2	7
Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	tens	Ones										
			3	5	2	7										
5. Integers	Whole numbers. These can be positive or negative.	4, 78, 124 and -34 are all integers														
6. Powers of 10	10 multiplied by itself a certain number of times	<p>10, 100, 1000,</p> <p>10,000, 100,000, 1,000,000</p>														

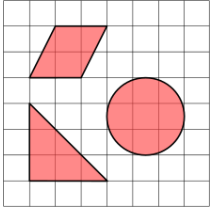

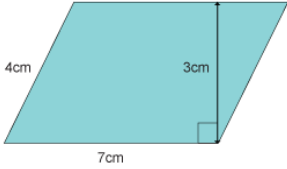
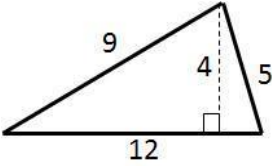
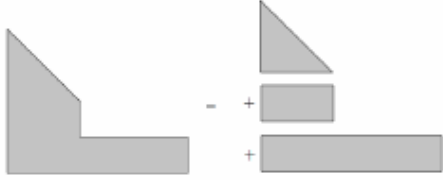
7. Comparing Integers	We can use the symbols = ≠ < > to compare integers. < less than > greater than = equal to ≠ not equal to	902 < 93 (less than) 8106 > 8099 (greater than) 305 = three hundred and five (equal to) 305 ≠ 350 (not equal)
8. Decimals	Decimal means "based on 10" Digits can be placed to the left or right of a decimal point, to show values greater than one or less than one.	17.591 is a decimal number On the left of the decimal is a whole number

9. Decimal Point	The decimal point positions all the digits in a number.	2.3 means 2 ones and 3 tenths
	Place value chart including decimals As we move left, each position is 10 times bigger. As we move right, each position is 10 times smaller.	Write in figures seventy-two hundredths 0.72
10. Decimal Place	The position of a digit to the right of a decimal point.	In the number 0.372, the 3 is in the 1st decimal place. Its value is 0.3 or 3 tenths
11. Comparing Decimals	We can put the numbers in order from smallest to biggest (ascending order) 1. Find the value of each digit starting from the left. 0. Compare the digits with the same place value starting from the left.	Put these numbers in ascending order 346.01 361.04310.46 1 st digit is 3 - 300 is the same in all 2 nd digit is 4, 6, and 1 - 1 is the smallest in the tens column so 310.46 is the smallest. The next smaller is 4 and last is 6. So in order 310.46 346.01361.04

Rounding

Topic/Skill	Definition/Tips	Example
1. Integers	Whole numbers. These can be positive or negative	4, 78, 124 and -34 are all integers
2. Powers of 10	10 multiplied by itself a certain number of times	10, 100, 1000, 10,000, 100,000, 1,000,000
3. Rounding to 10	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 .	46 rounds up to 50 , because 46 is closer to 50 than 40. 246 rounds up to 250 which is the nearest 10. 3,246 rounds to 3,250 which is the nearest 10
4. Rounding to 100	To make a number simpler but keep its value close to what it was.	278 rounds up to 300 which is the nearest 100 3,278 rounds up to 3,300 which is the nearest 100
5. Rounding to 1,000	To make a number simpler but keep its value close to what it was.	4,367 rounds down to 4,000 which is the nearest 1,000 4,867 rounds up to 5,000 which is the nearest 1,000
6. 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 is the first non zero digit from the left In a number with a decimal, trailing zeros are not significant. The zeros at the end are not significant	In the number 4,867 are 4 significant figures and the 1 st one is 4 In the number 0.00821, there are three significant figures the 1 st significant figure is the 8 In the number 2,740 the 0 is not a significant figure. This number has 3 significant figures..

Area

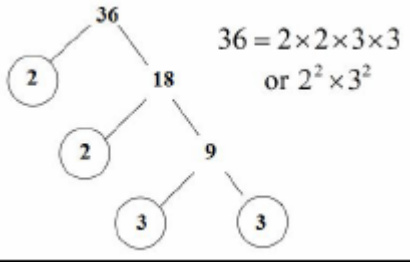
Topic/Skill	Definition/Tips	Example
1. Area	The amount of space inside a shape. Units include: mm ² , cm ² , m ²	
2. Area of a Rectangle	Length x Width	 $A=36\text{cm}^2$
3. Area of a Parallelogram	Base x Perpendicular Height Not the slant height.	 $A=21\text{cm}^2$
4. Area of a Triangle	Base x Height ÷ 2	 $A=24\text{cm}^2$
5. Compound Shape	A shape made up of a combination of other known shapes put together.	

Averages

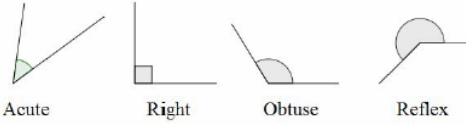
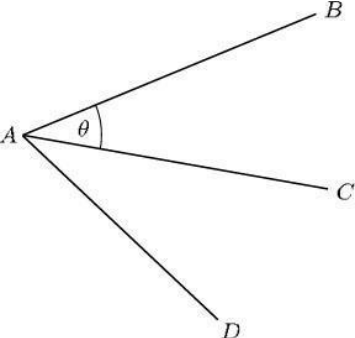
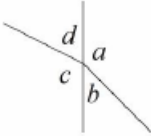
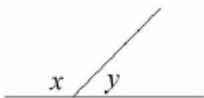
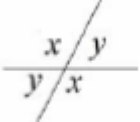
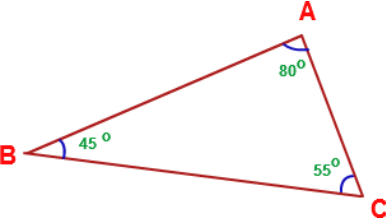
Topic/Skill	Definition/Tips	Example
1. Mean	Add up the values and divide by how many values there are.	The mean of 3, 4, 7, 6, 0, 4, 6 is $3+4+7+6+0+4+6=5$
2. Median Value	The middle value. Put the data in order and find the middle one. If there are two middle values , find the number half way between them by adding them together and dividing by 2 .	Find the median of: 4, 5, 2, 3, 6, 7, 6 Ordered: 2, 3, 4, 5 , 6, 6, 7 Median = 5
3. Mode /Modal Value	Most frequent/common. Can have more than one mode (called bi-modal or multi-modal) or no mode (if all values appear once)	Find the mode: 4, 5, 2, 3, 6, 4, 7, 8, 4 Mode = 4

4. Range	Highest value subtract the Smallest value Range is a 'measure of spread'. The smaller the range the more <u>consistent</u> the data.	Find the range: 3, 31, 26, 102, 37, 97. Range = $102 - 3 = 99$
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Types of Number

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'.	

Angles

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. Angles in a Triangle	<p>Angles in a triangle add up to 180°.</p>	

Percentages

Topic/Skill	Definition/Tips	Example
1. Percentage	<p>Number of parts per 100.</p>	<p>31% means $\frac{31}{100}$</p>

2. Finding 10%	To find 10% , divide by 10	10% of £36 = $36 \div 10 = \text{£}3.60$
3. Finding 1%	To find 1% , divide by 100	1% of £8 = $8 \div 100 = \text{£}0.08$

Algebra Skills

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:	$2x \equiv x+x$
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.	$3(m+7)=3m+21$

Sequences

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 $3 \times 100 - 1 = 299$
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Fractions

Topic/Skill	Definition/Tips	Example
1. Multiplying Fractions	1. Multiply the top numbers (numerators) 2. Multiply the bottom numbers (denominators) 3. Simplify the fraction if needed.	$\frac{3}{5} \times \frac{5}{6} = \frac{15}{30}$ $= \frac{1}{2}$
2. Multiply a fraction by integer	Make the whole number a fraction, by putting it over 1. Then multiply as above	$10 \times \frac{5}{6} = \frac{10}{1} \times \frac{5}{6}$ $\frac{50}{6}$
3. Multiply mixed numbers	Change them into improper fractions	
3. Multiplying mixed numbers	Convert numbers from mixed numbers to improper fractions Then multiply as above	$5 \frac{1}{2} \times 1 \frac{1}{4} =$ $1 \frac{1}{2} \times 2 \frac{2}{3} = \frac{3}{2} \times \frac{8}{3} =$ $\frac{24}{6} = 4$ $11/2 \times 5/4 =$ $55/8$
4. Reciprocal	The reciprocal of a number is 1 / number .	The reciprocal of 8 is $1/8$
5. Dividing Fractions	Keep, flip, change.	$\frac{5}{6} \div \frac{2}{3} =$ $\frac{5}{6} \times \frac{3}{2} = \frac{15}{12}$

6. Adding and subtracting	<p>Step 1: Find a common denominator.</p> <p>Step 2: "Whatever you do to the denominator, you do to the numerator".</p> <p>Step 3: Add or subtract the numerator.</p>	$\frac{3}{8} + \frac{1}{6} = \frac{9}{24} + \frac{4}{24}$ $= \frac{13}{24}$
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