Week.	Mathematical aspect	Non-negotiable end points Year 5.	Non-negotiable end points Year 6	Curriculum statements – Year 5.	Curriculum Statements. Year 6.
1.	Number and place value: Roman Numerals solving problems	Knows the Roman numerals up to M = 1000. Knows the rules of reading Roman numerals including years.	Knows how to use the whole number system, including saying, reading and writing numbers accurately.	● To read numerals to 1000 (M) and recognise years written in Roman numerals. ● To interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers through zero. ● To round any number up to 1,000,000 to the nearest 10, 100, 1000, 10,000 and 100,000. ● To solve number problems and practical problems that involve all of the above.	● To read, write, order and compare numbers at least to 10,000,000 and determine the value of each digit. ● To round any whole number to a required degree of accuracy. ● To use negative numbers in context and calculate intervals across zero. ● To solve number problems and practical problems that involve all of the above.

Links to resources and policy documents:

Roman Numeral	Number
I	1
V	5
X	10
L	50
C	100
D	500
M	1000

Which year is shown by MMVIII?

_____

Each diagram shows a number in numerals, words and Roman Numerals.

26 twenty six   XLIX

Complete the diagrams.

Work out what numbers these Roman numerals represent:

1. VIII = ☐   2. IV = ☐   3. XII = ☐   4. XV = ☐

5. LX = ☐   6. XL = ☐   7. XIV = ☐   8. XVII = ☐

Each diagram shows a number in digits, words and Roman Numerals.

500 five hundred   CCCII

1,000

Complete the diagrams.

Week.	Mathematical aspect	Non-negotiable end points Year 5.	Non-negotiable end points Year 6	Curriculum statements – Year 5.	Curriculum Statements. Year 6.
2.	Number and place value: Sequences Algebra: formulae	Knows how to describe linear number sequences, including those involving fractions and decimals, and find the term-to-term rule.	Knows how to use formulae in mathematics and science.	● To count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000. ● To read, write, order and compare numbers with up to three decimal places. ● To count using decimals and fractions including bridging zero, for example on a number line.	● To generate and describe linear number sequences. ● To use simple formulae

Links to resources and policy documents:

The following formula is used to convert a temperature in degrees Celsius (°C) to a temperature in degrees Fahrenheit (°F).

$$F = 1.8 \times C + 32$$

Use the formula to convert a temperature of 20 degrees Celsius to degrees Fahrenheit.

Here are Alfie and Emma with their parents.

Mother's height 160cm   Father's height 180cm

You can use the table below to predict how tall children will be when they are adults.

There is one formula for boys and a different one for girls:

Boy's predicted height	Girl's predicted height
$0.4(x + y) + 42$	$0.4(x + y) + 29$

x is the father's height in cm. y is the mother's height in cm.

Calculate the predicted height of Alfie when he is an adult.

c) In these equations, **a** is worth 7. Calculate the value of each shape:

△ = 3a	△ =
4 + a = ⬠	⬠ =
◇ = 10 - a	◇ =
a + a = ☐	☐ =

Ali has made three sequences of shapes by sticking coloured squares together.

The sequence of red shapes starts

and so on.

The sequence of blue shapes starts

and so on.

The sequence of green shapes starts

and so on.

Ali says, 'If I put a red and a blue shape together, they will make a shape that is the same as one of the green shapes.'

Do you agree with Ali?

Explain your reasoning.

Which of the following statements do you agree with? Explain your decisions.

■ The value 5 satisfies the symbol sentence 3 × ☐ + 2 = 17
■ The value 7 satisfies the symbol sentence 3 + ☐ × 2 = 10 + ☐
■ The value 6 solves the equation 20 − x = 10
■ The value 5 solves the equation 20 ÷ x = x − 1

| 3. | Multiplication and Division: Properties of number | Know the terms factor, multiple, prime, square and cube numbers. | Know the terms factor, multiple, prime, square and cube numbers. | ● recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3) ▢ solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes | ● To identify common factors, common multiples and prime numbers; |

Links to resources and policy documents:

Find the common factors of each pair of numbers.

24 and 36

20 and 30

28 and 45

Now we are going to find some lowest common multiples for the following pairs of numbers.

The lowest common multiple of 6 and 9 is

The lowest common multiple of 8 and 6 is

The lowest common multiple of 8 and 7 is

On a 100 square, shade the first 5 multiples of 7 and then the first 8 multiples of 5

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

What common multiple of 7 and 5 do you find?

Use this number to find other common multiples of 7 and 5

The sum of two prime numbers is 36

What are the numbers?

Multiply the lowest common multiple of 4 and 9 by the biggest common factor of 6 and 18.

| 4. | All four operations: mental methods. | Knows efficient methods for adding, subtracting, multiplying and dividing | Knows how to use mental calculations with increasingly large numbers and more complex calculations. | ● To add and subtract numbers mentally with increasingly large numbers
● To solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.
● To multiply and divide numbers mentally drawing upon known facts. | ● To perform mental calculations, including with mixed operations and large numbers.
● To solve addition and subtraction multi-step problems in contexts, deciding which operations to use and why.
● To use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy. |

Links to resources and policy documents:

What is 2 minus 0.005?

What is 5.7 added to 8.304?

12 980 + ▢ = 13125

23,111 − 47 = ▢

149 + 137 + ▢ = 650

(▢ + ▢) x ▢ = 10

Can you add brackets to make this true?

$(3 \times 8) \div (2 + 4) = 4$

Calculate 36·2 + 19·8
- with a formal written column method
- with a mental method, explaining your reasoning.

Calculate

$32 + 8 \times 5$

$16 \div 4 + 2 =$

$12 + 8 \div 4 =$

Compare $31 + 9 \times 7$ and $(31 + 9) \times 7$
What's the same? What's different?

Choose operations to go in the empty boxes to make these number sentences true.
6 ▢ 3 ▢ 7 = 16
6 ▢ 3 ▢ 7 = 27
6 ▢ 3 ▢ 7 = 9

Put brackets in these number sentences so that they are true.
$12 − 2 \times 5 = 50$
$12 − 8 − 5 = 9$
$10 \times 8 − 3 \times 5 = 250$

Common factors can be related to finding equivalent fractions.

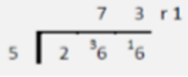Calculate $900 \div (45 \times 4)$.

5.	Addition and subtraction: written methods	Knows efficient written methods for addition and subtractions	Knows and uses efficient written methods for addition and subtractions	● To add and subtract whole numbers with more than 4 digits, including using efficient written methods (columnar addition and subtraction). ● To solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why. ● To use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy. ● To solve problems involving numbers up to three decimal places.	● To solve problems involving addition, subtraction, multiplication and division. ● To use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.

Links to resources and policy documents:

For these calculations, what rounded calculation would you use to check the answer:

$3487 + 2725 = 6212$

$5892 + 614 = 6506$

$7523 + 3892 = 11\ 415$

$713 + 4661 = 5374$

```
  25567
  16397
+15984
 57948
  1 1 21
```

```
   2 3 1
  52344
-  1187
  51157
```

$124.9 + 7.25$

```
  124.90
+   7.25
  132.25
   1 1
```

$324.9 - 7.25$

```
   1 1 8 1
  324.90
-   7.25
  317.65
```

1	7	3	4	3
+	4	5	8	6
2	1	9	2	9

Ensure pupils understand why and how to line up the decimal point when some numbers begin in a different column.

0	9	1	3	1	
1	0	5	4	1	9	kg
-	3	6	0	8	0	kg
6	9	3	3	9	kg

Add a zero to empty decimal places to aid understanding of place value.

Work out the missing numbers.

?	4	?	3	?
+ 2	?	5	?	2
7	8	5	2	9

12, 400	456,247	278,194	45,200	5,500
2,300	983,190	13,895	120,000	40,660
45,000	157,321	1, 500	25,678	27,460
37,890	34, 678	35,000	1,800	30,000
39,500	567,210	578,472	234,160	150,000

Choose two numbers that you can:

- add together in your head
- add using a written method
- subtract in your head
- subtract using a written method

Alisha has £18.35 in her purse. Her father gives her £5 pocket money. She buys a book for £7.99 and a bag for £13.49. How much will she have left?

6.	Multiplication and division: Written methods	Knows efficient written methods for multiplication and division	Knows and uses efficient methods for multiplication and division.	● To multiply numbers up to 4 digits by a one- or two-digit number using an efficient written method, including long multiplication for two-digit numbers. ● To divide numbers up to 4 digits by a one-digit number using the efficient written method of short division and interpret remainders appropriately for the context.	● To solve problems involving addition, subtraction, multiplication and division. ● To use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.

Links to resources and policy documents:

17 | 581 ÷ 7 =

581 ÷ 7 could be calculated by the formal written method of short division or it could be calculated by rearranging the dividend, using known facts, into 560 and 21.

⚓	1	3	4	2	
			1	8	x
1	0	7	3	6	
1	3	4	2	0	
2	4	1	5	6	

Correct the errors in the calculation below. Explain the error. 266 ÷ 5 = 73.1

```
      7  3 r1
5 | 2 ³6 ¹6
```

```
   28
x  27
  196
  560
  756
```

5309 ÷ 8

```
  0 6 6 3 r 5
8)5 3 0 9
```

The remainder could be expressed as five eighths, r5, as a decimal number, or rounded up or down as appropriate for the problem.

If 6 ÷ 2 = 3 then 6000 ÷ 2 = 3000
and
6000 ÷ 20 = 300

17 ÷ 5
'What do I know? 17 is not a multiple of 5."
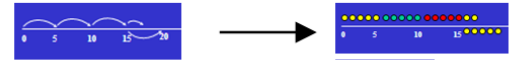
3

$3\frac{2}{5}$

$3\frac{2}{5} = 3.4$

From knowledge of decimal/fraction equivalents or by

converting $\frac{2}{5}$ into $\frac{4}{10}$.

```
        4  2
×       □  3
        1  2  6
   □    6  8  0
 □□□□
```
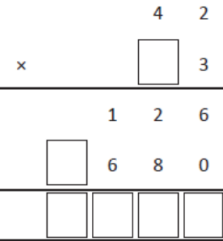
| 7. | Geometry: properties of shape, diagonals | Knows the term diagonal and can make conjectures about the angles formed between sides, and between diagonals and parallel sides, and other properties of quadrilaterals. | Knows how to describe the properties of shapes and explain how unknown angles and lengths can be derived from known measurements. | ● To know angles are measured in degrees; estimate and compare acute, obtuse and reflex angles
 ● To draw given angles and measure them in degrees (º).
 ● To identify: angles at a point and one whole turn (total 360º)
 ● angles at a point on a straight line and 1/2 a turn (total 180º)
 ● other multiples of 90º.
 ● To use the properties of a rectangle to deduce related facts and find missing lengths and angles.
 ● To distinguish between regular and irregular polygons based on reasoning about equal sides and angles. | ● To compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons
 ● To illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius |

Links to resources and policy documents:

Billy says there are perpendicular and parallel lines in this rectangle. Is he correct? Prove it!
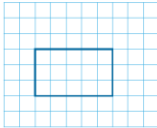
• The perimeter is 12cm.
• A is 2cm shorter than B.

B

A

Length A =

Length B =
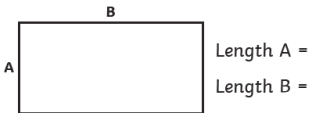
A right angle is _____ degrees.
Acute angles are _____ than a right angle.
Obtuse angles are _____ than a right angle.

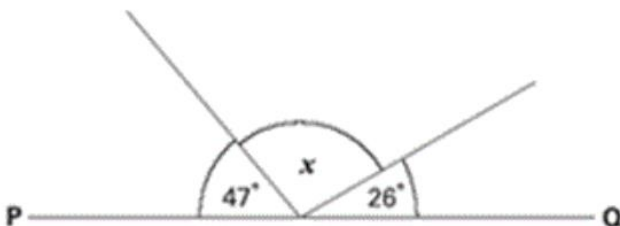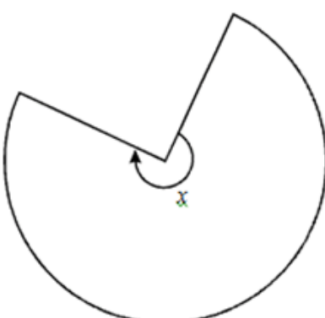reflex   right   acute   obtuse
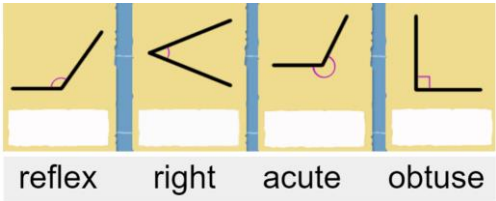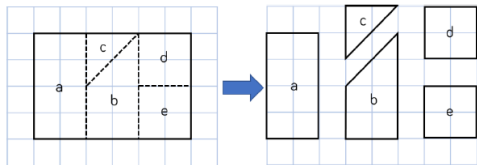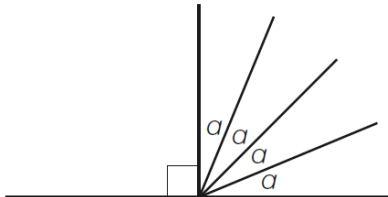
Look at these angles.
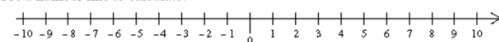
angle P   angle Q   angle R   angle S   angle T
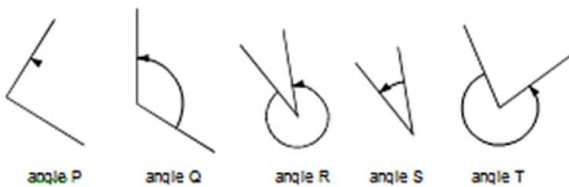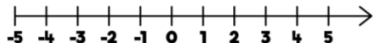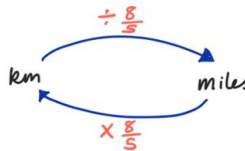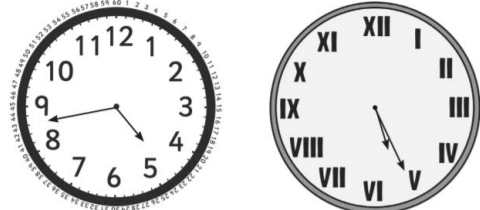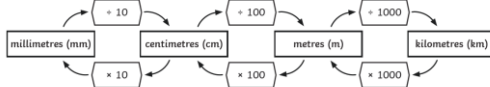
Label each angle acute, obtuse or reflex. List the 5 angles in order from smallest to largest.

Calculate the size of the angles in each shape.

What's the same? What's different?

The angles marked *a* are all equal.

What is the size of *a* ?

PQ is a straight line. Not drawn accurately.

Calculate the size of angle x. Do not use a protractor (angle measurer).

This shape is three-quarters of a circle.

How many degrees is angle x?

8.	Measurement; Time and money.	Knows how to use all four operations in problems involving time and money, including conversions.	Knows how to use all four operations in problems involving time and money, including conversions.	● To use all four operations to solve problems involving measure (e.g. length, mass, volume, money) using decimal notation including scaling ● To solve problems involving converting between units of time.	● To use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places;

Links to resources and policy documents:

Put these lengths of time in order starting with the longest time.

105 minutes
1 hour 51 minutes
6360 seconds

An advert says 'Hire this car for 72 hours.'
How many days is this?

days

If a car travelled 560 km in 8 hours, work out how far it travelled in half an hour and in 4 hours:

Price list

footballs	£4.40 each
tennis balls	£6.50 for 3
golf balls	£4.35 for 4

I buy 8 golf balls, 12 tennis balls and 2 footballs.
How much change will I get from £50?

A length of string measures 10 m.
Rob cuts off six pieces. Each piece measures 120 cm.
How much string is left over?

Tara has a 2 *l* bottle of lemonade.
She has 7 glasses which can be almost filled with the lemonade.
If she uses all the lemonade, give an estimate of the capacity of the glass.

A flight from Britain to America takes 8 hours 12 minutes.
How many minutes is this altogether?

_____ minutes

9	Measurement: solving problems, including temperature.	Knows how to convert between metric units measurement.	Knows how to connect conversion to a graphical representation as preparation for	● To convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre);	● To solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate.

			understanding linear/proportional graphs. Knows approximate conversions of imperial/metric units. Knows how to use a number line to add and subtract positive and negative integers for measures such as temperature.	● To understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints;	● To use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places

Links to resources and policy documents:

1 inch ≈ 2.5 centimetres

Convert 12.5 cm into inches.

Use a number line to calculate:

+	-4	-2	0	2	4
-3					
-1					
1					
3					

Today, Aberdeen is 6°C colder than Newcastle is.

The temperature in Cardiff this lunchtime is exactly halfway between that of Manchester and Southampton.

This lunchtime, Southampton is 11°C warmer than Belfast.

The temperature in Norwich will be 8°C warmer than Edinburgh today.

Today, the temperature in Leeds will be 6°C below that in Plymouth.

The temperature in Manchester this lunchtime is -2°C.

Birmingham is 3°C warmer than Manchester today.

This lunchtime, the temperature in Edinburgh will be exactly · halfway between that of Birmingham and Aberdeen

The temperature in Newcastle is 5°C colder than Cardiff today.

This lunchtime, London will be 4°C warmer than Leeds.

Today, the temperature in Plymouth is 1°C warmer than Norwich.

Belfast is 6°C colder than Birmingham is this lunchtime.

Use the number line to answer the questions.

- What is 6 less than 4?
- What is 5 more than −2?
- What is the difference between 3 and −3?

How to convert **km** to **miles**

There are ___ mm in one centimetre.
There are ___ cm in one metre.
There are ___ m in one kilometre.
Use these facts to complete the table.

mm	cm	m	km
44,000			
	2,780		
		15.5	
			1.75

When we convert:

a	tonnes to kilograms we		by	1000
b	kilograms to tonnes we		by	

1. Here are 2 clocks. How much faster is the one on the right?

mm	cm	m	km
	20 000		
		412	
			1.1

10.	Fractions: Calculating Calculating %	Knows how to calculate with fractions. Knows how to find LCM and HCF for simplifying. Knows how to find 10% and 1% of an amount using division by 10 and 100.	Knows how to calculate with accuracy.	● To add and subtract fractions with the same denominator and multiples of the same number. ● To multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams ● To recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal. ● To solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2},\frac{1}{4},\frac{1}{5},\frac{2}{5},\frac{4}{5}$ and those fractions with a denominator of a multiple of 10 or 25.	● To solve problems which require answers to be rounded to specified degrees of accuracy. ● To recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.

Links to resources and policy documents:				

On Monday I ran $1\frac{2}{3}$ km and on Tuesday I ran $2\frac{2}{5}$ km. How far did I run altogether on these two days?
 	
On Wednesday I ran $1\frac{2}{3}$ km and my sister ran $2\frac{2}{5}$ km. How much further did my sister run than I did?
 	
Last month Kira saved $\frac{3}{5}$ of her £10 pocket money. She also saved 15% of her £20 birthday money.
 	
How much did she save altogether?
 	
Curtis used $\frac{1}{3}$ of a can of paint to cover 3·5 square metres of wall.
 	
How much wall will one whole can of paint cover?
			Eva has a full tin of paint. She uses $\frac{1}{3}$ of the tin on Friday, $\frac{1}{21}$ on Saturday and $\frac{2}{7}$ on Sunday. How much paint does she have left?
			
			Tommy is adding mixed numbers. He adds the wholes and then adds the fractions. Then, Tommy simplifies his answer.
			
			$1\frac{1}{2} + 2\frac{1}{6} = 1\frac{3}{6} + 2\frac{1}{6} = 3\frac{4}{6} = 3\frac{2}{3}$
			
			Use Tommy's method to add the fractions.
			
			$3\frac{1}{2} + 2\frac{3}{8} =$ $34\frac{1}{9} + 5\frac{2}{5} =$ $12\frac{5}{12} + 2\frac{1}{7} =$
			
			$\frac{1}{4} \div 2$ We know this is the same as: $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$
			
			Now it's your turn!
			
			$\frac{1}{5} \div 2 = \frac{1}{5} \times$ ▢ = ▢
			
			$\frac{1}{6} \div 3 = \frac{1}{6} \times$ ▢ = ▢
			
			$\frac{3}{11} \div 4 = \frac{3}{11} \times$ ▢ = ▢
			
			$\frac{1}{2} \times \frac{2}{3} = \frac{2}{6} = \frac{1}{3}$
				In each number sentence, replace the boxes with different whole numbers less than 20 so that the number sentence is true:
				
				$\frac{▢}{▢} = \frac{3}{▢}$
				
				$\frac{▢}{3} = \frac{▢}{12}$
				
				$\frac{▢}{▢} = \frac{▢}{▢}$
				
				▢ ÷ ▢ = ▢ · ▢
				
				$\frac{30}{▢} = \frac{45}{▢}$
				
				Number these equivalents in order from smallest (1) to largest (6):
				
				$\frac{1}{2}$ ▢
				
				0.875 ▢
				
				25% ▢
				
				75% ▢
				
				0.2 ▢
				
				$\frac{1}{8}$ ▢
				
				10. George needs to round the following lengths. Work alone or with a partner to complete them.
				  • 50% of 345cm rounded to the nearest metre.
				  • $\frac{3}{4}$ of 5.4m rounded to the nearest tenth of a metre.
				  • 30% of 475mm rounded to the nearest centimetre.
				  • $\frac{4}{5}$ of 23.4cm rounded to the nearest millimetre.

11.	Ratio and Proportion; Solving problems	Knows how to solve problems with proportion.	Knows how to solve problems with ratio and proportion.	● To solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.	● To solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts ● To solve problems involving similar shapes where the scale factor is known or can be found. ● To solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.
Links to resources and policy documents:				
To make a sponge cake, I need six times as much flour as I do when I'm making a fairy cake. If a sponge cake needs 270 g of flour, how much does a fairy cake need? Sam and Tom share 45 marbles in the ratio 2:3. How many more marbles does Tom have than Sam?			Look at this recipe for Yorkshire puddings. **Serves 3 people** 1 egg 50 g flour 50 ml milk How much flour would you need to make puddings for 6 people? ▢ g Complete this: "for every egg you need ▢ g flour and ▢ ml milk." To make a tomato pizza topping for a normal pizza, Jake uses 300 g of tomatoes, 120 g of onions and 75 g of mushrooms. Jake wants enough sauce for a giant pizza, so he uses 900 g of tomatoes. What mass of onions will be used? How many 120 g boxes of mushrooms will he have to buy?	Two friends are sharing a collection of 48 football cards. Jack gives Owen three cards for every one card that he keeps for himself. How many football cards does Jack keep for himself? 48 football cards There are two bags of marbles. In the first bag, for every 3 red marbles there are 2 green marbles. In the second bag, for every 1 red marble there are 2 green marbles. There are the same number of marbles in each bag. The second bag of marbles contains 10 green marbles. How many red marbles are in the first bag?

12.	Statistics; Reading timetables line graphs	Knows how to read a timetable and complete missing information.	Knows how to interpret and draw graphs relating two variables, arising from their own enquiry and in other subjects.	●To complete, read and interpret information in tables, including timetables ● To solve comparison, sum and difference problems using information presented in a line graph;	To interpret and construct pie charts and line graphs and use these to solve problems.

Links to resources and policy documents:

The buses on this timetable all take the same time to travel the route. Complete the table.

Mill Road	0726		0842
High St	0729	0803	
Southey Green		0816	0858
Pitsmoor Road	0759	0833	
Snig Hill	0812		0928
Hunters Bar		0904	0946
Fulwood	0845	0919	

1. A Line Graph Showing the Temperature of a Day in August

a) What was the temperature at 17:00?

b) What time was the highest temperature recorded?

c) At which times was the temperature less than 19°C?

d) What was the difference in temperature between the lowest and highest temperature?

The table shows average rainfall in Leicester over a year. Complete the graph using the information from the table.

Month	Rainfall (mm)
Jan	54
Feb	40
Mar	38
Apr	38
May	48
Jun	46
Jul	58
Aug	60
Sep	50
Oct	57
Nov	65
Dec	50

This two-way table shows the staff at Liverpool police station.

	Male	Female	Total
Constable	55	24	79
Sergeant	8	5	13
Inspector	2	4	6
Chief Inspector	1	1	2
Total	66	34	100

- How many female inspectors are there?
- How many male sergeants are there?
- How many constables are there altogether?
- How many people work at Liverpool police station?
- How many male inspectors and female constables are there altogether?

This timetable shows the morning flights from Manchester to London. The timetable shows the times and days of the flights.

Dep	Arr	Airline	Flight number	Mon	Tue	Wed	Thur	Fri	Sat	Sun
06:00	07:00	B.A.	BA1371	✓	✓			✓		
07:20	08:30	B.A.	BA1385						✓	
07:25	08:25	V.A.A.	VS3046	✓	✓	✓	✓	✓	✓	✓
07:25	08:35	B.A.	BA1385	✓	✓	✓	✓			✓
07:35	08:45	B.A.	BA1385					✓		
08:35	09:45	B.A.	BA1373			✓	✓			
08:50	10:00	B.A.	BA1387	✓	✓	✓	✓	✓		✓
09:50	11:00	B.A.	BA1389		✓				✓	✓
09:55	11:05	B.A.	BA1389	✓				✓		
10:40	11:40	V.A.A.	VS3042	✓	✓	✓	✓	✓	✓	✓
11:20	12:30	B.A.	BA1391	✓		✓				
11:25	12:35	B.A.	BA1391		✓		✓	✓		

Answer these questions.

a) What is the longest flight time?

_____

b) How many flights to London are there on a Friday?

_____

c) Dev arrives at Manchester Airport at 08:00 on Saturday for the next flight to London.
At what time will he arrive in London?

_____