

# MATHS AUTUMN 1 KNOWLEDGE ORGANISERS



# Year 5 Unit 1

## Place Value—Ordering and Comparing



Ascending order	Arranged from smallest to largest	14, 15, 18, 23	
Descending order	Arranged from largest to smallest	123, 101, 99, 53, 1	
Digit	One of the symbols of a number system most commonly the symbols 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9. The position or place of a digit in a number tells you its value.		
Numeral	A symbol used to denote a number. The Arabic numerals 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9 are used in the Hindu-Arabic system giving numbers in the		

Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
5	8	2	4	4	2	8

First we read the millions part: five million.  
 Then we read the thousands part: eight hundred and twenty-four thousand.  
 Finally we read this part: four hundred and twenty-eight.

**5 824 428** is five million, eight hundred and twenty-four thousand, four hundred and twenty-eight.

- = is equal to, equals
- ≠ is not equal to
- ≈ is approximately equal to
- < is less than
- > is greater than
- ≤ is less than or equal to
- ≥ is greater than or equal to

Round 5643 to the nearest 10

When rounding to the nearest 10, we need to look at the **digit** in the **ones** column. In 5643, **3** is less than **5** so we round **down**. **5643 rounded to the nearest 10 is 5640.**

Round 5643 to the nearest 100

When rounding to the nearest 100, we need to look at the **digit** in the **tens** column. In 5643, **40** is less than **50** so we round **down**. **5643 rounded to the nearest 100 is 5600.**

Round 5643 to the nearest 1000

When rounding to the nearest 1000, we need to look at the **digit** in the **hundreds** column. In 5643, **600** is more than **500** so we round **up**. **5643 rounded to the nearest 1000 is 6000.**

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



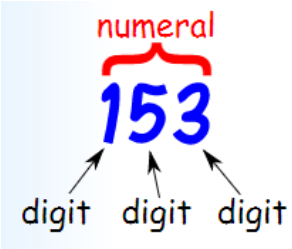
  

1	I	11	XI	200	CC
2	II	20	XX	300	CCC
3	III	30	XXX	400	CD
4	IV	40	XL	500	D
5	V	50	L	600	DC
6	VI	60	LX	700	DCC
7	VII	70	LXX	800	DCCC
8	VIII	80	LXXX	900	CM
9	IX	90	XC	1000	M
10	X	100	C	1001	MI

# Year 6 Unit 1

## Place Value—Ordering and Comparing



Ascending order	Arranged from smallest to largest	14, 15, 18, 23 
Descending order	Arranged from largest to smallest	123, 101, 99, 53, 1 
Digit	One of the symbols of a number system most commonly the symbols 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9. The position or place of a digit in a number tells you its value.	
Numerals	A symbol used to denote a number. The Arabic numerals 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9 are used in the Hindu-Arabic system giving numbers in the form that is widely used today.	

Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
5	8	2	4	4	2	8

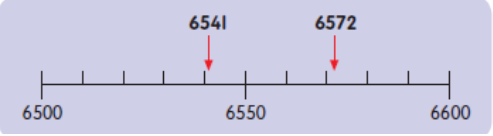
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**5 824 428** is five million, eight hundred and twenty-four thousand, four hundred and twenty-eight.

- =** is equal to, equals
- ≠** is not equal to
- ≈** is approximately equal to
- <** is less than
- >** is greater than
- ≤** is less than or equal to
- ≥** is greater than or equal to



6541 is between 6500 and 6600.  
6541 is nearer to 6500 than to 6600.  
6541 is **6500** when rounded to the nearest hundred.

6572 is between 6500 and 6600.  
6572 is nearer to 6600 than to 6500.  
6572 is **6600** when rounded to the nearest hundred.

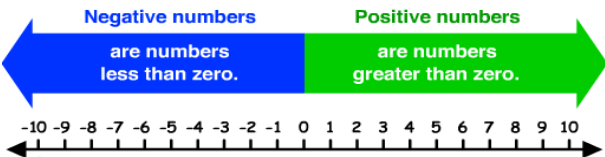
4 8 3   2	4 8 3   7	1 9   5
No	Yes	Yes
4 8 3 0	4 8 4 0	2 0 0

**5 or more, ↑  
let it soar.**

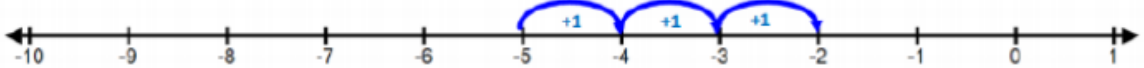
**4 or less, ↓  
let it rest.**

**Negative numbers** are numbers that are less than zero.

4 is greater than -7, -3 is greater than -9



We can use a numberline to help to find the difference between 2 numbers. To find the difference between -2 and -5 we need to count the jumps between them. The difference is 3



# Year 6 Unit 2 – Addition, subtraction, multiplication and division



Addition	The joining of two or more numbers or quantities.	In <b>addition</b> two or more numbers are joined to get one number which is the <b>sum</b> or the <b>total</b> .
Sum Total	The result of adding; the whole amount	
Subtraction	When one quantity is taken away from another	80 <b>subtract</b> 30 is 50.
Difference	The result of subtracting one number from another	The <b>difference</b> between 80 and 30 is 50
Product	The result when two numbers are multiplied.	
Factor	Numbers we can multiply together to get another number.	
Multiple	The result of multiplying a number by a positive whole number	6, 12, 18, 20, 24 ..... are all multiples of 6
Commutative	Numbers can be multiplied in any order, but in division the order is important.	
Inverse	The reverse or opposite of an operation.	
Square Number	To square a number: just multiply it by itself. 4 squared is $4 \times 4 = 16$ . Often shown with a little 2 in the corner like this: $4^2 = 16$ that is said "4 squared equals 16"	<p>4  <math>2^2</math> or <math>2 \times 2 = 4</math></p> <p>9  <math>3^2</math> or <math>3 \times 3 = 9</math></p>
Cube Number	The result of using a whole number in a multiplication three times.	<p><math>5 \times 5 \times 5 = 125</math></p> <p>so <math>5^3 = 125</math></p>
Prime Numbers	A whole number <b>greater than 1</b> that can not be made by multiplying other whole numbers. They only have 2 factors; one and themselves	

prime numbers to 100									
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

## Order of Operations

- Brackets
- Powers /Indices
- Multiplication or Division
- Addition or Subtraction

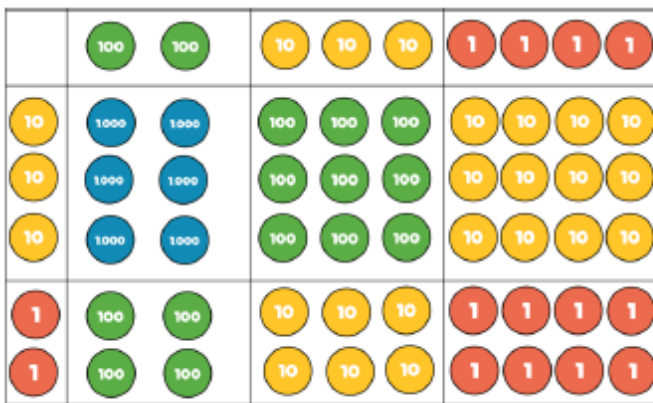
# Year 6 Unit 2 – Addition, subtraction, multiplication and division—part 2



## Multiplication methods



$$\begin{array}{r} 34 \\ \times 5 \\ \hline 170 \\ \hline 12 \end{array}$$



	Th	H	T	O
		2	3	4
x			3	2
		4	6	8
17	1	0	2	0
	7	4	8	8

x	200	30	4
30	6,000	900	120
2	400	60	8

$$234 \times 32 = 7,488$$

## Division methods

		0	3	6
	12	4	43	72

$$432 \div 12 = 36$$

$$7,335 \div 15 = 489$$

		0	4	8	9
15		7	73	133	135

15	30	45	60	75	90	105	120	135	150
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# Year 6 Unit 2 – Addition, subtraction, multiplication and division



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Sum Total	The result of adding; the whole amount	
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prime numbers to 100									
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

## Order of Operations

- Brackets
- Powers /Indices
- Multiplication or Division
- Addition or Subtraction

# Year 7 -Unit 2 and 3

## Algebraic Thinking



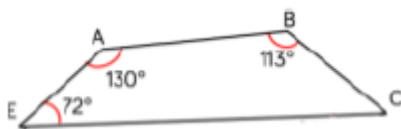
Function	An operation that links an input and an output.	$3 \xrightarrow{\text{Input}} \boxed{\times 2} \xrightarrow{\text{Output}} 6$ <p>The function is to multiply by 2</p>
Variable	A quantity that can take a range of values, often represented by a letter.	<p>Coefficient      Variable</p> $4x - 7 = 5$ <p>Operator      Constants</p>
Coefficient	A number used to multiply a variable. 6a means 6 times a Variables with no number have a coefficient of 1. a just means 1 times a	
Constant	A fixed value	
Expression	A mathematical statement, using numbers, symbols and operators	<p>Expression</p> $4x - 7 = 5$
Equation	An equation says that two things are equal	
Substitute	Exchanging letters for numerical values	$x + \frac{x}{2}$ $x = 5 \rightarrow 5 + \frac{5}{2}$
Commutative	Numbers can be added or multiplied in any order.	$a + b = b + a$ $6 + 2 = 8$ <p>or</p> $2 + 6 = 8$
Notation	In algebra we use particular notation for different calculations.	<div style="display: flex; flex-wrap: wrap;"> <div style="border: 1px solid purple; padding: 5px; margin: 5px;"> <p><b>We group letters together</b></p> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid purple; padding: 2px;"> <math>a + a + a</math> means 3 lots of a <math>3 \times a</math> </div> <div style="border: 1px solid purple; padding: 2px;"> <math>b + b</math> means 2 lots of b <math>2 \times b</math> </div> </div> </div> <div style="border: 1px solid yellow; padding: 5px; margin: 5px;"> <p><b>We do not use multiplication signs</b></p> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid yellow; padding: 2px;"> <math>3 \times a = 3a</math> <math>5 \times b = 5b</math> </div> <div style="border: 1px solid yellow; padding: 2px;"> <math>a \times b = ab</math> <math>a \times b \times c = abc</math> </div> </div> </div> <div style="border: 1px solid green; padding: 5px; margin: 5px;"> <p><b>We write division using fraction notation</b></p> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid green; padding: 2px;"> <math>a \div 2</math> is written as <math>\frac{a}{2}</math> or <math>\frac{1}{2}a</math> </div> <div style="border: 1px solid green; padding: 2px;"> <math>b \div 3</math> is written as <math>\frac{b}{3}</math> or <math>\frac{1}{3}b</math> </div> </div> </div> <div style="border: 1px solid red; padding: 5px; margin: 5px;"> <p><b>We use indices/powers</b></p> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid red; padding: 2px;"> <math>a \times a</math> <math>= a^2</math> (a squared)                 </div> <div style="border: 1px solid red; padding: 2px;"> <math>b \times b \times b</math> <math>= b^3</math> (b cubed)                 </div> </div> </div> </div>

# Year 8 Unit 1— Construction, measuring and geometric notation



Polygon	A 2D shape having 3 or more straight sides.  <b>Regular</b> polygons have all sides and angles equal.	3 sides—triangle 5 sides—Pentagon 7 sides—Heptagon/Septagon 9 sides—Nonagon	4 sides—Quadrilateral 6 sides—Hexagon 8 sides—Octagon 10 sides—Decagon
Parallel	Lines that remain the same distance apart.		
Perpendicular	Lines that <b>intersect</b> (cross over) at right angles.		

## Notation

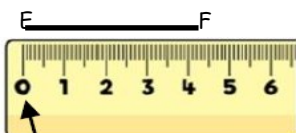


ABC is the notation for the angle at B that measures  $113^\circ$

EC is the **line segment** that joins the points E and C

<p>3 equal sides 3 equal angles</p> <p><b>Equilateral</b></p>	<p>2 equal sides 2 equal angles</p> <p><b>Isosceles</b></p>
<p>1 angle is a right angle (<math>90^\circ</math>)</p> <p><b>Right-angled</b></p>	<p>no equal sides no equal angles</p> <p><b>Scalene</b></p>

## Measuring a line segment

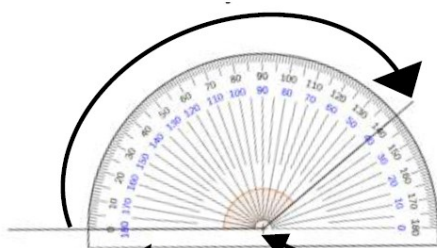


EF is 43mm long, this is 4.3cm  
(10mm = 1cm)

Remember to start from 0

## Measuring an angle

This is an obtuse angle, greater than  $90^\circ$



Line up one of the line segments with 0

Put the cross where the two lines meet

## A quadrilateral is a shape with four sides.

<p><b>Square</b> 4 equal sides 4 right angles</p>	<p><b>Rectangle</b> opposite sides are equal 4 right angles</p>	<p><b>Trapezium</b> 1 pair of parallel sides</p>
<p><b>Rhombus</b> 4 equal sides opposite sides are parallel opposite angles are equal</p>	<p><b>Parallelogram</b> opposite sides are equal and parallel</p>	<p><b>Kite</b> 2 pairs of adjacent sides are equal</p>

## Types of angle

<p><b>Acute Angle</b> <math>&lt; 90^\circ</math></p>	<p><b>Right Angle</b> = <math>90^\circ</math></p> <p>Notice the special notation</p>
<p><math>90^\circ &lt;</math> <b>Obtuse angle</b> <math>&lt; 180^\circ</math></p>	<p><b>Straight Line</b> = <math>180^\circ</math></p>
<p><math>180^\circ &lt;</math> <b>Reflex angle</b> <math>&lt; 360^\circ</math></p>	