MPA International School

YEAR 5

MATHEMATICS

Reference Resources Booklet (1)

Name : ……..……

ID : ……..……

2026-2027 Academic Year

Preface

At MPA International School, we are committed to nurturing learners who are not only knowledgeable but also capable of guiding their own learning journey. This booklet has been carefully prepared to support our students as a confident, curious, and independent learner by providing clear, structured notes that reinforce key concepts and offer guidance across all related topics.

Each section in this booklet connects directly to the topics of the textbook, offering:

- Clear explanations of key ideas
- Concept summaries for quick revision
- Supportive notes that encourage **self-study** and **personal reflection**

This resource is designed to help students' **review at their own pace**, explore topics more deeply, and strengthen what they've learned in class. Whether they're preparing for a quiz, completing homework, or simply curious to know more—this booklet is here to guide and support them. Most importantly, use it to grow as a **self-directed learner**—someone who learns with purpose, confidence, and curiosity.

This resource is not meant to replace active learning or classroom discussion but to empower students to revisit important content at their own pace—whether reviewing after a lesson, preparing for a quiz, or exploring further out of curiosity.

We hope this booklet empowers you to take ownership of your learning with purpose and pride.

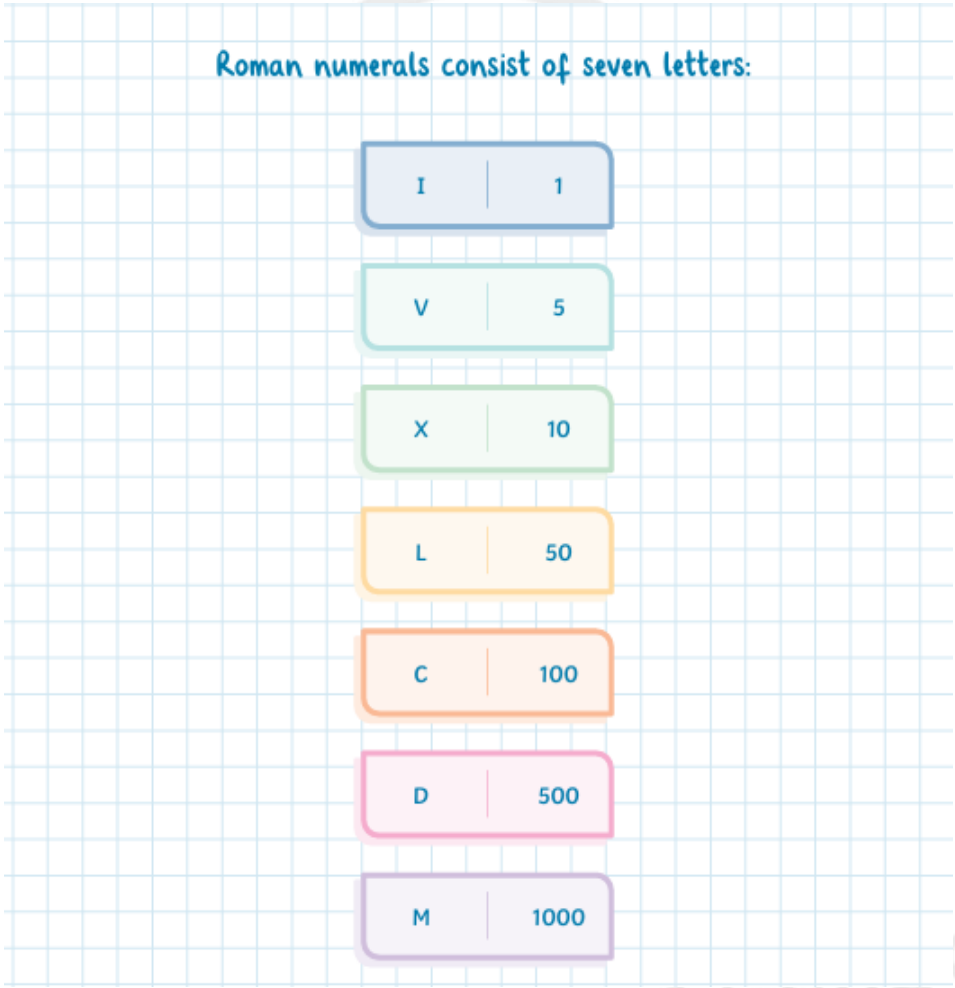
Academic Team
MPA International School

Contents

Unit 1 – Place value within 1,000,000(1)

What are Roman numerals?

Roman numerals originated in ancient Rome. They are believed to have come from the ancient Etruscans. The symbol for 1 probably began as a simple tally mark made in wood or dirt as a way of counting and recording. It would be a very easy mark to make on a wax tablet, too.



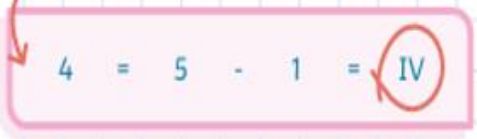
What are Roman numerals?

How are the numbers formed?

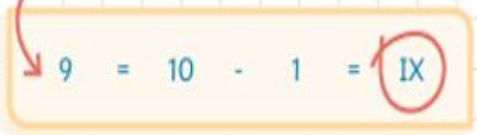
If a letter that represents a smaller number comes before a larger one, it needs to be subtracted.

Subtraction Examples

IV is 1 before 5, which is 4.



IX is 1 before 10, which is 9.



If a letter that represents a smaller number comes after a larger one, it needs to be added.

Addition Examples

LVI is 50 and 5 and 1.

XVIII is 10 and 5 and 3.

Twinkl Tip: You might need to add and subtract to find the number being represented. For example, XIV is 10 + 1 before 5. This is 10 + 4, which is equal to 14.

I	1 =	1
II	1 + 1 =	2
III	1+1+1=	3
IV	5-1=	4
V	5 =	5
VI	5+1 =	6
VII	5+1+1=	7
VIII	5+1 +1 + 1 =	8
IX	10 - 1 =	9
X	10 =	10
XI	10+1=	11
XII	10+ 1+1=	12
XIII	10+ 1 + 1 + 1 =	13
XIV	10+ (5-1) =	14
XV	10+ 5 =	15
XVI	10+ 5+1 =	16
XVII	10+ 5 + 1 + 1 =	17
XVIII	10+ 5 + 1 + 1 + 1 =	18
XIX	10+ (10-1) =	19
XX	10 + 10 =	20

XXX	10 + 10 + 10 =	30
XL	50 – 10 =	40
IIL	50 – 2 =	48
L	50 =	50
IC	100 – 1 =	99
C	100 =	100
CC	100 + 100 =	200
CCC	100 + 100 + 100 =	300
CD	500 – 100 =	400
D	500 =	500
DC	500 + 100 =	600
DCC	500 + 100 + 100 =	700
DCCC	500 + 100 +100 + 100 =	800
CM	1000-100 =	900
M	1000 =	1000
CXL	100 + (50 -10) =	140
CCLXXX	100 + 100 + 50 + 10 + 10 + 10 =	280
MMCCLXIII	1000 + 1000 + 100 + 100 + 50 + 10 + 3 =	2263
MCCCIL	1000 + 100 + 100 + 100 + (50 -10) =	1349
MMDXXIX	1000 + 1000 + 500 + 10 + 10 + (10-1) =	2529
MCMXX	1000 + (1000 – 100) + 10 + 10	1920

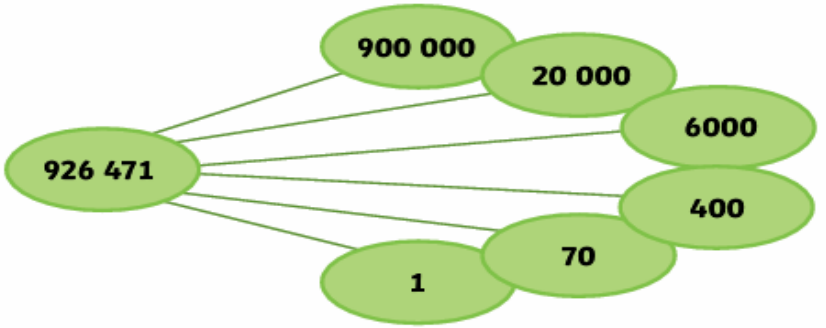
Number and Place Value — Knowledge Organiser

Numbers to One Million

926 471

Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
9	2	6	4	7	1

nine hundred and twenty-six thousand, four hundred and seventy-one



Roman Numerals

	I = 1	II = 2	III = 3	
IV = 4	V = 5	VI = 6	VII = 7	VIII = 8
IX = 9	X = 10	XI = 11	XX = 20	XXX = 30
XL = 40	L = 50	LX = 60	LXX = 70	LXXX = 80
XC = 90	C = 100	CL = 150	CC = 200	CCC = 300
CD = 400	D = 500	DC = 600	DCC = 700	DCCC = 800
CM = 900	M = 1000	MC = 1100	MD = 1500	MM = 2000

twinkl
visit twinkl.com

CCXLVIII = 248 DCCLXXXIV = 784 MMXIX = 2019

Rounding

Rounding to the nearest 10

20	21	22	23	24	25	26	27	28	29	30

round down — round up

Rounding to the nearest 1000

2000	← 2499	2500	→ 3000

round down — round up

Rounding to the nearest 100 000

200 000	← 249 999	250 000	→ 300 000

round down — round up

Expanded form

45691 = 4 ten thousands + 5 thousands + 6 hundreds + 9 tens + 1 one

7 ten thousands + 6 thousands + 8 tens + 4 ones = **76,084**

54,623 = 50,000 + 4,000 + 600 + 20 + 3

43,564 = Forty-three thousand five hundred sixty-four.

One million = 10 hundred thousands

One million = 100 ten thousands

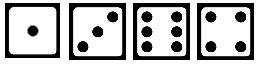
One million = 1,000 thousands

One million = 10,000 hundreds

One million = 100,000 tens

One million = 1,000,000 ones

Write each number correctly, including a comma.

 = 1,364

5,600 =56 hundreds

7,800 = 78 hundreds

541,000 = 541 thousands

67,000 = 670 hundreds

89,000 = 890 hundreds

500,000 = 5 hundred thousands

500,000 = 50 ten thousands

500,000 = 500 thousands

500,000 = 5,000 hundreds

500,000 = 50,000 tens

500,000 = 500,000 ones

Number sequence	Number sequence
56,000 , 66,000 , 76,000 , 86,000 + 10,000 + 10,000 + 10,000	73,240 , 74,240 , 75,240 , 76,240 + 1,000 + 1,000 + 1,000

Three different ways in sequence.

590,000	600,000	610,000	**620,000**	630,000
	- 10,000	- 10,000	- 10,000	+ 10,000
560,000	580,000	600,000	**620,000**	640,000
	- 20,000	- 20,000	- 20,000	+ 20,000
530,000	560,000	590,000	**620,000**	650,000
	- 30,000	- 30,000	- 30,000	+ 30,000

Unit 2 – Place value within 1,000,000 (2)

Number and Place Value — Knowledge Organiser

Key Vocabulary

- millions
- thousands
- hundreds
- tens
- ones
- zero
- place value
- greater than
- less than
- order
- round
- rounded
- negative number
- partition
- digit
- interval
- sequence
- linear sequence

Compare and Order

equals	greater than	less than
$26 + 38 = 8 \times 8$	$23\,873 > 8256$	$901\,198 < 1\,091\,098$
Both calculations have the value 64.	The number on the left has 2 ten thousands and the number on the right has 0 ten thousands.	The number on the right has 1 million and the number on the left has 0 millions.

smallest | 898 | 6735 | 6835 | 7019 | 9002 | 11 235 | greatest

Negative Numbers

Counting in Powers of 10

Counting in 10s

365	375	385	395	405	415

The tens increase until 9 tens becomes one more hundred and 0 tens.

Counting in 100s

2841	2941	3041	3141	3241	3341

The hundreds increase until 9 hundreds becomes one more thousand and 0 hundreds.

Counting in 10 000s

276 109	286 109	296 109	306 109

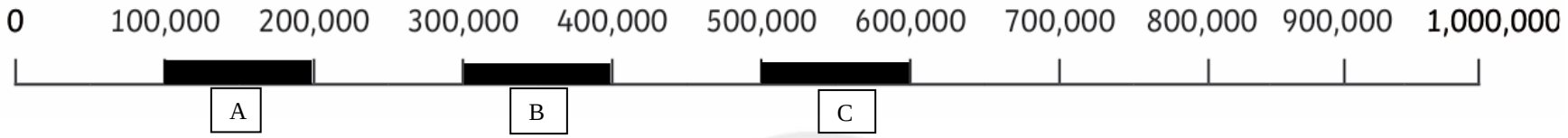
The ten thousands increase until 9 ten thousands become one more hundred thousand and 0 ten thousands.

Counting in 100 000s

2 972 151	3 072 151	3 172 151	3 272 151

The hundred thousands increase until 9 hundred thousands becomes one more million and 0 hundred thousands.

Three different numbers for each shaded section of the number line.



A	B	C
110,000	301,000	560,000
120,000	350,000	574,000
135,000	390,999	582,555

Previous 100,000		Next 100,000
400,000	436,099	500,000

Previous 10,000		Next 10,000
70,000	78,654	80,000

Previous 1,000		Next 1,000
8,000	8,654	9,000

Previous 100		Next 100
8,500	8,654	8,700

Round Any Number

Rounding to the nearest 1000

2000 ← 2499	2500 → 3000
round down	round up

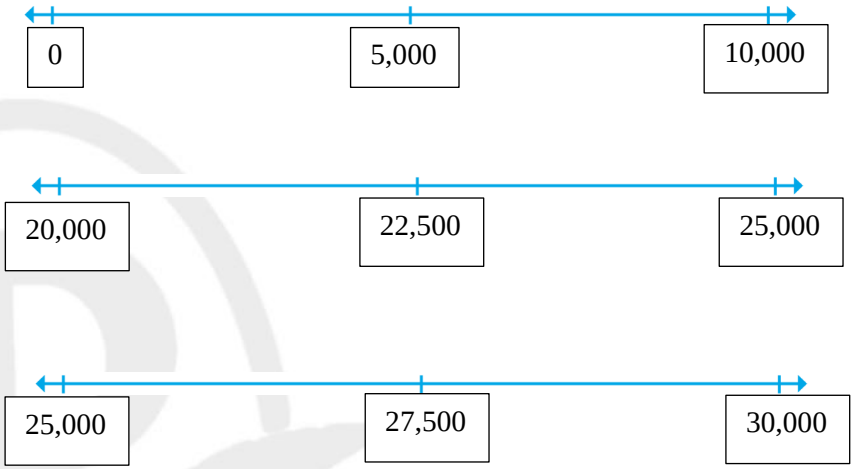
Rounding to the nearest 10 000

20000 ← 24999	25000 → 30000
round down	round up

Rounding to the nearest 100 000

200 000 ← 24 9999	250 000 → 300 000
round down	round up

Half between 10,000 numbers.



Unit 3 – Addition and subtraction

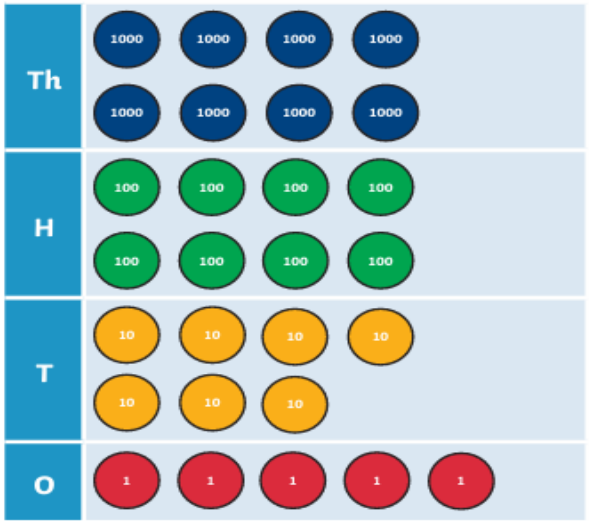
Addition and Subtraction — Knowledge Organiser

Key Vocabulary

- Add
- Total
- Make
- Plus
- Sum
- More
- Altogether
- Difference
- Subtract
- Less
- Minus
- Take away
- Column addition
- Column subtraction
- Estimate
- Inverse operation
- Number facts
- Place value
- Complex

Addition

Place Value Grid: 3274 + 5601 = 8875



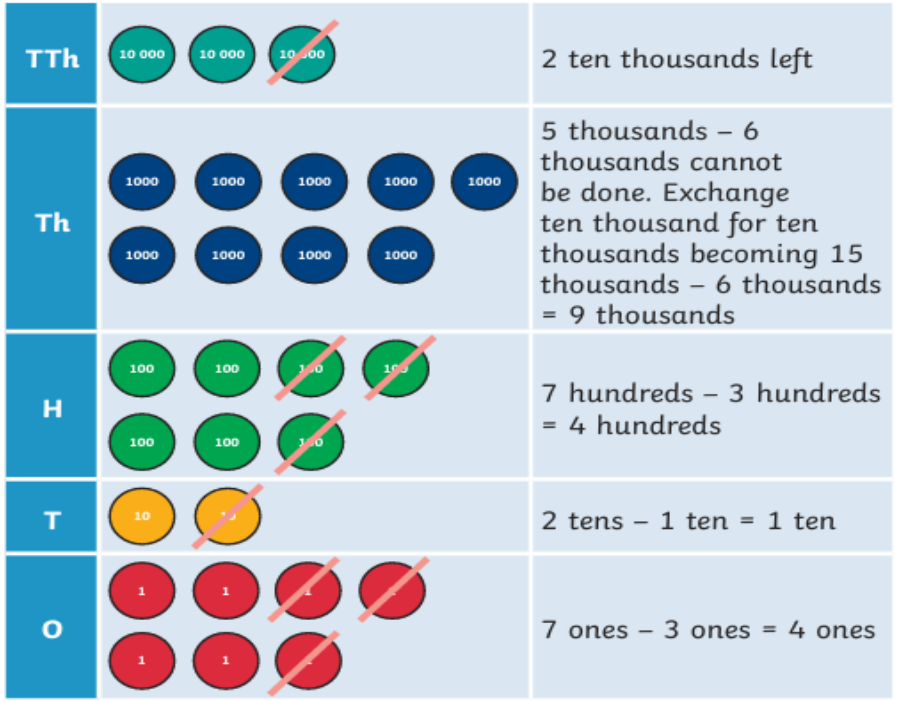
Column Method

Starting with the ones, add each column in turn. Regroup tens, hundreds, thousands, ten thousands and/or as required.

$$\begin{array}{r} 45864 \\ +\,23497 \\ \hline 69361 \\ \hline 1\,1\,1 \end{array}$$

Subtraction

Place Value Grid: 35 727 – 6313 = 29 414



Column Method

Starting with the ones, subtract each column in turn. Exchange tens, hundreds, thousands and/or ten thousands as required.

$$\begin{array}{r} {}^{6}\cancel{3}\,{}^{13}\cancel{5}\,{}^{1}7\,42 \\ -\;\;3\,4\,7\,6 \\ \hline 3\,2\,2\,6\,6 \end{array}$$

Mental strategies

44 + 53

40 + 50 = 90

4 + 3 = 7

So, 44 + 53 = 97

67 - 45

67 – 40 = 27

27 – 5 =22

So, 67 – 45 = 22

57 – 34 = 23

570 – 340 = 230

5,700 – 3,400 = 2,300

Missing number

5,439 (Total	
3,214 (part)	?

5, 4 3 9

- 3, 2 1 4

2, 2 2 5

Rounding (hundred)

324 + 402

324 is close to **300**

402 is close to **400**

300 + **400** = 700

So, 324 + 402 must be closet to **700**

568 - 365

568 is close to **600**

365 is close to **400**

600 - 400 = 200

So, 568 - 365 must be closet to **200**

Inverse operation (addition and subtraction)

5,642 – 3,894 = 1748

$$\begin{array}{r} 3,894 \\ +\ 1,748 \\ \hline 5,642 \end{array}$$

4,351 + 2,137 = 6,488

$$\begin{array}{r} 6,488 \\ -\ 2,137 \\ \hline 4351 \end{array}$$

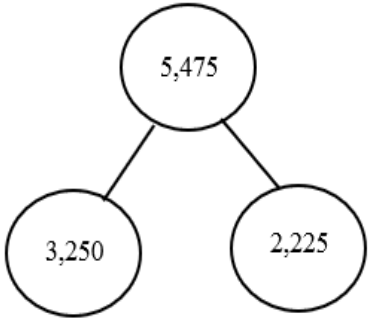
To **check subtraction**, **add the answer to the number you subtracted**:

If the result equals the starting number, your subtraction is correct.

Subtract one of the numbers from the result.

If the answer equals the other number, your addition is correct.

Fact family



3,250 + 2,225 = 5,475

2,225 + 3,250 = 5,475

5,475 – 3,250 = 2,225

5,475 – 2,225 = 3,250

Missing numbers

35 + **43** = 78 (78 – 35 = 43)

45 + **14** = 59 (59 – 14 = 45)

37 + **51** = 88 (88 – 37 = 51)

Missing numbers

4,400 – **2,600** = 1,800 (4,400 – 1,800 = 2,600)

3,900 - 1,600 = 2,300 (2,300 + 1,600 = 3,900)

5,350 – **3,100** = 2,250 (5,350 – 2,250 = 3,100)

Comparison

49 + 24 = 47 + _____

73 = 47 + _____ (73 – 47 = 26)

73 = 47 + **26**

Comparison

812 - 245 = 811 - _____

567 = 811 - _____ (811-567 = 244)

567 = 811 - **244**

Addition and Subtraction — Knowledge Organiser

Estimate and Approximate

Rounding to Estimate

41 635 + 7386 = 49 021

Round to ten:

41 630 + 7380 = 49 010

41 630 + 7390 = 49 020

41 640 + 7390 = 49 030

Rounding is not as accurate when both numbers are rounded up. A better estimate comes from "rounding" one down and one up.

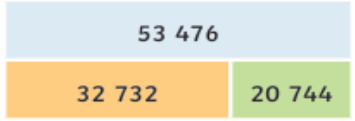
Estimating on a Number Line

The arrow is about $\frac{3}{4}$ of the way across the line so it is 40 000.

twinkl visit twinkl.com

Inverse Operations

Use the inverse to check:



To check 53 476 – 32 732 = 20 744 use 32 732 + 20 744 = 53 476

Start with a number, subtract 409 and double. I end with 6264.

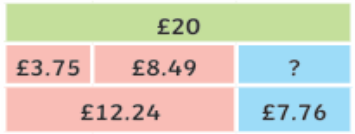
To find the starting number use the inverse: halve, then add 409. Half of 6264 = 3132. 3132 + 409 = 3541. The starting number was 3541.

Multistep Problems

Using a Bar Model

The sum of two numbers is 25 567.
The difference is 1875.

Subtract 1875 from 25 567 = 23 692.
Halve 23 692 to find smaller number = 11 846.
Add 1875 to find larger number = 13 721.



£20 is used to buy 2 books costing £3.75 and £8.49.

How much change is given?

£3.75 + £8.49 = £12.24

£20.00 - £12.24 = £7.76

Unit 4 – Multiplication and division (1) and Unit 7 – Multiplication and division (2)

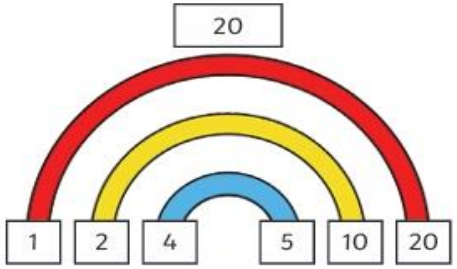
Multiplication and Division — Knowledge Organiser

Key Vocabulary

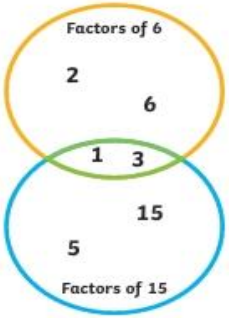
- multiply
- groups of
- lots of
- times
- divide
- share
- remainder
- factor
- multiple
- product

Factors

A factor is a number that divides into another number exactly, without leaving a remainder.



A common factor is a factor of 2 or more numbers.



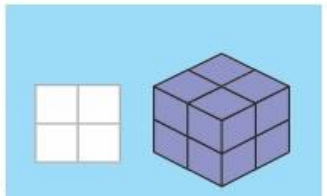
The factors of 20 are 1, 2, 4, 5, 10 and 20.

The factor pairs are:
1 and 20
2 and 10
4 and 5

Prime Numbers

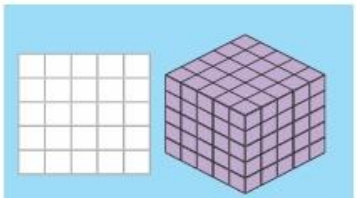
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Squared² and Cubed³ Numbers



$2^2 = 4$; $2 \times 2 = 4$

$2^3 = 8$; $2 \times 2 \times 2 = 8$



$5^2 = 25$; $5 \times 5 = 25$

$5^3 = 125$; $5 \times 5 \times 5 = 125$

Related Calculations

$8 \times 9 = 72$ $80 \times 9 = 720$	$9 \times 8 = 72$ $90 \times 8 = 720$
$72 \div 9 = 8$ $720 \div 9 = 80$	$72 \div 8 = 9$ $720 \div 8 = 90$
$724 \times 10 = 7240$ $724 \times 100 = 72\,400$ $724 \times 1000 = 724\,000$	$486\,000 \div 10 = 48\,600$ $486\,000 \div 100 = 4860$ $486\,000 \div 1000 = 486$

$3600 \div 400 = 9$

3600 → (÷ 100) → 36 → (÷ 4) → 9

Multiplication and Division

Knowledge Organiser

Short Multiplication

$2543 \times 7 = 17\,801$

	2	5	4	3
×				7
1	**7**	**8**	**0**	**1**
1	3	3	2	

Remember to move any regrouped digits into the next column. After the next multiplication, add the regrouped number to the answer.

Long Multiplication

$2543 \times 67 = 170\,381$

		2	5	4	3
	×			6	7
	1 1	7 3	8 3	0 2	1
1 1	5 3	2 2	5 1	8	0
1	**7**	**0**	**3**	**8**	**1**
	1	1			

Before multiplying by the number in the tens column, remember to use zero as a placeholder because the 6 in 67 is 6 tens (60).

Short Division

		3	8
4	1	$^{1}5$	2

15 ÷ 4 = 3 remainder 3

Remember to regroup any remainders and move them into the next column.

		4	5	5	r	3
5	2	2	$^{2}7$	$^{2}8$		

28 ÷ 5 = 5 remainder 3

If your calculation has a remainder, remember to record it in the answer using the letter **r**.

Division

$136 \div 4 = 34$

		3	4	
4	1	3	6	
−	1	2	0	→ 30 × 4
		1	6	
	−	1	6	→ 4 × 4
			0	

Multiply a 2-Digit Number by a 2-Digit Number

Here are two methods to calculate 27 × 14.

A

×	20	7
10	200	70
4	80	28

200 + 70 + 80 + 28 = 378

B

		2	7	
×		1	4	
	1	0_2	8	(27 × 4)
	2	7	0	(27 × 10)
	3	7	8	

Use both these methods to calculate 45 × 32.

×	40	5
30	1200	150
2	80	10

1200 + 150 + 80 + 10 = 1440

		4	5	
×		3	2	
		9_1	0	(45 × 2)
1	3_1	5	0	(45 × 30)
1	4	4	0	
	1			

Multiply a 3-Digit Number by a 2-Digit Number

213 × 23

	2	1	3	
×		2	3	
	6	3	9	(213 × 3)
4	2	6	0	(213 × 30)
4	**8**	**9**	**9**	

328 × 73

		3	2	8	
	×		7	3	
		9	8_2	4	(328 × 3)
2	2_1	9_5	6	0	(328 × 70)
2	**3**	**9**	**4**	**4**	
	1	1			

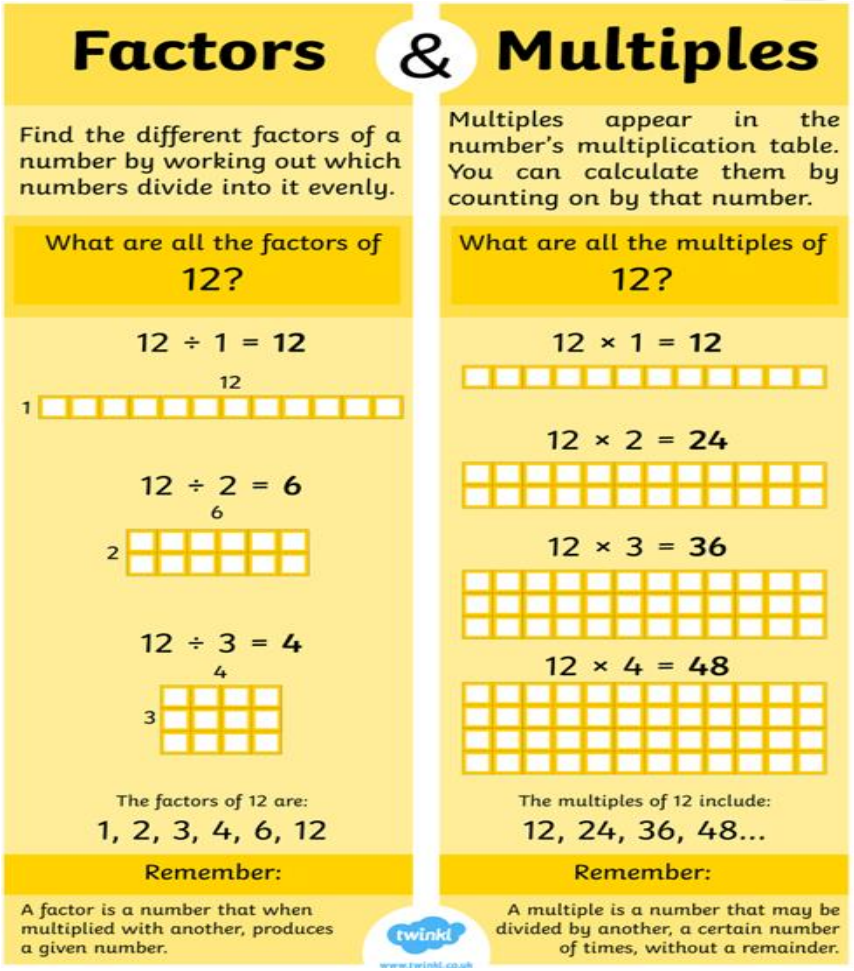
Factors and multiples

Factors

A factor is a number that when multiplied with another, produces a given number.

Multiples

A multiple is a number that may be divided by another, a certain number of times, without a remainder.



Common multiples

A common multiple is a number that is a multiple of two or more different numbers.

List the first ten multiples of 4 and 5

Multiple of 4	Multiple of 5
4	5
8	10
12	15
16	20
20	25
24	30
28	35
32	40
36	45
40	50

The first two common multiple of 4 and 5 = 20 and 40

Write down the multiple of 5.

5,10,15,20,25,30,35,40,...

Write down the multiple of 9.

9,18,27,36,45,54,63,...

Write down the first five multiple of 3.

3,6,9,12,15

Write down the first five multiple of 7.

7,14,21,28,35

"If the multiples are not limited, you must add 'etc (...)' at the end. If they are limited, then there is no need to add 'etc (...)'."

Square Numbers

1^2	1	× 1	=	1
2^2	2	× 2	=	4
3^2	3	× 3	=	9
4^2	4	× 4	=	16
5^2	5	× 5	=	25
6^2	6	× 6	=	36
7^2	7	× 7	=	49
8^2	8	× 8	=	64
9^2	9	× 9	=	81
10^2	10	× 10	=	100

The product of a number multiplied by itself.

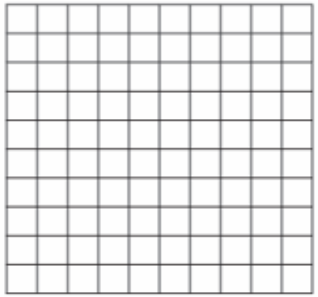
e.g. 10 × 10 = 100

which can be shown as:

$10^2 = 100$

10 squared = 100

10 × 10 = 100



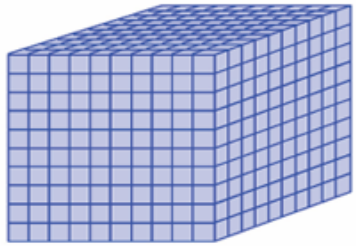
Cube Numbers

1^3	1 x 1 x 1 =	1
2^3	2 x 2 x 2 =	8
3^3	3 x 3 x 3 =	27
4^3	4 x 4 x 4 =	64
5^3	5 x 5 x 5 =	125
6^3	6 x 6 x 6 =	216
7^3	7 x 7 x 7 =	343
8^3	8 x 8 x 8 =	512
9^3	9 x 9 x 9 =	729
10^3	10x10x10 =	1000
11^3	11x 11 x 11 =	1331
12^3	12x 12 x 12 =	1728
13^3	13x 13 x 13 =	2197
14^3	14x 14 x 14 =	2744
15^3	15x 15 x 15 =	3375

Formed by multiplying a digit by itself 3 times

e.g. 10 x 10 x 10 = 1000 which can be shown as:

$10^3 = 1000$
10 cubed = 1000
10x10x10 cube



Unit 5 – Fractions (1), Unit 6 – Fractions (2), Unit 8 – Fractions (3)

Fractions — Knowledge Organiser

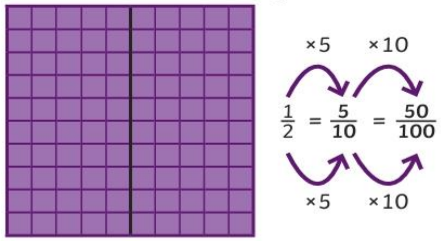
Key Vocabulary

- numerator
- denominator
- unit fraction
- non-unit fraction
- whole
- equivalent
- mixed number
- improper fraction
- simplest form
- multiple
- common denominator
- common numerator

twinkl visit twinkl.com

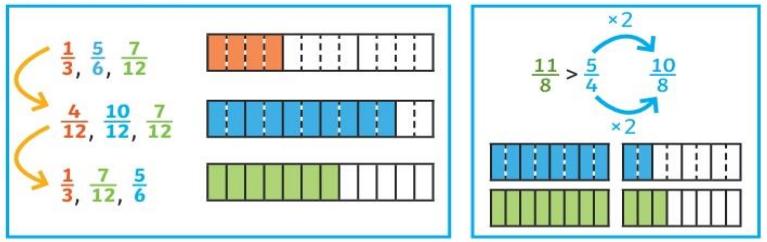
Equivalent Fractions

To find equivalent fractions, we multiply or divide the numerator and denominator by the same number.



Compare and Order Fractions

We can compare and order fractions by using common denominators.



Mixed Numbers

Mixed numbers contain a whole number and a fraction.

whole → $2\frac{1}{4}$ ← fraction

Improper Fractions

An improper fraction has a numerator which is greater than or equal to the denominator.

$\frac{5}{3}$

Convert an Improper Fraction to a Mixed Number

$\frac{9}{4}$

$9 \div 4 = 2r1$ → Divide the numerator by the denominator.

$2\frac{1}{4}$ ← This shows you the whole number and the fraction.

Convert a Mixed Number to an Improper Fraction

Multiply the whole by the denominator to make an improper fraction.

$2\frac{5}{6} = \frac{12}{6} + \frac{5}{6} = \frac{17}{6}$

Add the fractions together.

Fractions of Quantities

To find a fraction of a number, divide by the denominator and multiply by numerator.

To find quarters of 20:

20			
5	5	5	5

$\frac{1}{4}$ of 20 = 5 $\frac{2}{4}$ of 20 = 10 $\frac{3}{4}$ of 20 = 15 $\frac{4}{4}$ of 20 = 20

To find eighths of 56:

56							
7	7	7	7	7	7	7	7

$\frac{1}{8}$ of 56 = 7 $\frac{2}{8}$ of 56 = 14 $\frac{3}{8}$ of 56 = 21 $\frac{4}{8}$ of 56 = 28

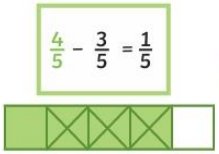
$\frac{5}{8}$ of 56 = 35 $\frac{6}{8}$ of 56 = 42 $\frac{7}{8}$ of 56 = 49 $\frac{8}{8}$ of 56 = 56

Fractions — Knowledge Organiser

Adding and Subtracting Fractions

$\frac{1}{3} + \frac{1}{3} = \frac{2}{3}$

$\frac{4}{5} - \frac{3}{5} = \frac{1}{5}$



$\frac{1}{4} + \frac{3}{8} = \frac{2}{8} + \frac{3}{8} = \frac{5}{8}$

$\frac{5}{6} - \frac{2}{3} = \frac{5}{6} - \frac{4}{6} = \frac{1}{6}$

To add or subtract fractions with denominators that are multiples of the same number, we must change one fraction to have the same denominator.

Add Fractions When the Total is Greater Than 1

$\frac{1}{2} + \frac{3}{4} + \frac{5}{8} = \frac{4}{8} + \frac{6}{8} + \frac{5}{8} = \frac{15}{8} = 1\frac{7}{8}$

Add Mixed Numbers

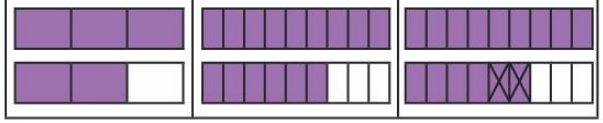
$1\frac{1}{4} + \frac{3}{8} = 1\frac{2}{8} + \frac{3}{8} = 1 + \frac{5}{8} = 1\frac{5}{8}$

$1\frac{1}{4} + \frac{3}{8} = \frac{5}{4} + \frac{3}{8} = \frac{10}{8} + \frac{3}{8} = \frac{13}{8} = 1\frac{5}{8}$

Subtract From a Mixed Number

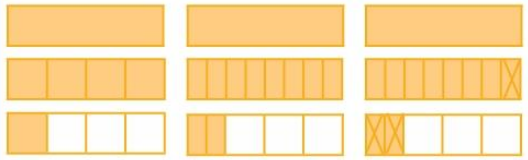
$1\frac{2}{3} - \frac{2}{9} = 1\frac{6}{9} - \frac{2}{9} = 1\frac{4}{9}$

starting number	find the equivalent fraction	subtract



Subtract from a Mixed Number - Breaking the Whole

$2\frac{1}{4} - \frac{3}{8} = 2\frac{2}{8} - \frac{3}{8} = 1\frac{10}{8} - \frac{3}{8} = 1\frac{7}{8}$



Subtract Two Mixed Numbers

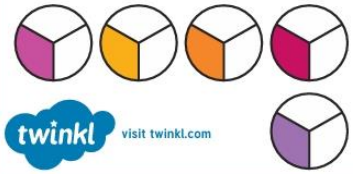
$2\frac{3}{4} - 1\frac{5}{8} = 1\frac{1}{8}$

$2 - 1 = 1$

$\frac{3}{4} - \frac{5}{8} = \frac{1}{8}$

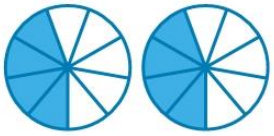
Multiply Unit Fractions by an Integer

$\frac{1}{3} \times 5 = \frac{5}{3}$



twinkl visit twinkl.com

Multiply Non-Unit Fractions by an Integer



$2 \times \frac{4}{9} = \frac{8}{9}$

Multiply Mixed Numbers by Integers

Convert to an improper fraction and multiply the numerator by the integer.

$2\frac{1}{4} \times 2 = \frac{9}{4} \times 2 = \frac{18}{4} = 4\frac{2}{4} = 4\frac{1}{2}$

Use repeated addition.

$2\frac{1}{4} \times 2 = 2\frac{1}{4} + 2\frac{1}{4} = 4\frac{2}{4} = 4\frac{1}{2}$

Compare and order mixed number

First step – Compare the whole numbers in the mixed numbers. Whole number bigger fraction is more bigger.

Second step – If the whole numbers are the same, then compare the proper fractions.

$2\frac{3}{5}$ and $2\frac{2}{10}$ | $\frac{3}{5} = \frac{6}{10} > \frac{2}{10}$

So, $2\frac{3}{5} > 2\frac{2}{10}$

Missing part in fraction

Addition sentence

$\frac{11}{25} + \frac{\square}{\square} = \frac{19}{25}$ $\left(\frac{19}{25} - \frac{11}{25} = \frac{8}{25}\right)$

$\frac{\square}{\square} + \frac{8}{25} = \frac{19}{25}$ $\left(\frac{19}{25} - \frac{8}{25} = \frac{11}{25}\right)$

Subtraction sentence

$\frac{14}{20} - \frac{\square}{\square} = \frac{8}{20}$ $\left(\frac{14}{20} - \frac{8}{20} = \frac{6}{20}\right)$

$\frac{\square}{\square} - \frac{6}{20} = \frac{8}{20}$ $\left(\frac{8}{20} + \frac{6}{20} = \frac{14}{20}\right)$

Add two mixed numbers

Same denominator

$3\frac{1}{4} + 2\frac{1}{4} = 2 + 3 + \frac{1}{4} + \frac{1}{4} = 5 + \frac{2}{4} = 5\frac{2}{4}$

Change same denominator

$2\frac{1}{2} + 3\frac{1}{4} = 2 + 3 + \frac{1}{2} + \frac{1}{4} = 5 + \frac{1}{2} + \frac{1}{4} = 5 + \frac{2}{4} + \frac{1}{4}$

$= 5 + \frac{3}{4}$

$= 5\frac{3}{4}$

Subtract two mixed numbers

(1)

$3\frac{5}{6} - 1\frac{1}{3} = (3-1) + \left(\frac{5}{6} - \frac{1}{3}\right) = 2 + \left(\frac{5}{6} - \frac{2}{6}\right) = 2 + \frac{3}{6} = 2\frac{3}{6} = 2\frac{1}{3}$

(2)

$4\frac{1}{4} - 2\frac{5}{8} = \left(3 + 1 + \frac{1}{4}\right) - 2\frac{5}{8} = \left(3 + \frac{4}{4} + \frac{1}{4}\right) - 2\frac{5}{8} = 3\frac{5}{4} - 2\frac{5}{8} = 3\frac{10}{8} - 2\frac{5}{8} = (3-2) + \left(\frac{10}{8} - \frac{5}{8}\right)$

$= 1 + \frac{5}{8}$

$= 1\frac{5}{8}$

"When subtracting mixed numbers, the proper fractions must be compared. If the first fraction is larger, you can solve it using method (1). If the first fraction is smaller, you can solve it using method (2)."

Multiply unit fractions by an integer

$2 \times \frac{1}{4} = \frac{2 \times 1}{4} = \frac{2}{4} = \frac{1}{2}$

$7 \times \frac{1}{4} = \frac{7 \times 1}{4} = \frac{7}{4} = 1\frac{3}{4}$

Multiply non unit fractions by an integer

$\frac{3}{4} \times 16 = \frac{3 \times 16}{4} = \frac{48}{4} = 12$

$\frac{3}{\cancel{4}_{1}} \times \cancel{16}^{4} = 3 \times 4 = 12$

Multiply mixed numbers by integers

$4\frac{5}{8} \times 4 = \frac{37}{\cancel{8}_{2}} \times \cancel{4}^{1} = \frac{37}{2} = 18\frac{1}{2}$

Fraction of amount

$\frac{5}{7}$ of $42 = \frac{5}{\cancel{7}_{1}} \times \cancel{42}^{6} = 5 \times 6 = 30$

Missing number

$\frac{2}{3}$ of $\square = 10$ ($10 \div 2 = 5$ and $3 \times 5 = \mathbf{15}$)

$\frac{\square}{9}$ of $27 = 12$ ($27 \div 9 = 3$ and $12 \div 3 = 4$)

Multiply fraction by fraction.

$1\frac{\cancel{3}^{1}}{\cancel{5}} \times \frac{\cancel{5}^{1}}{\cancel{9}_{3}} = \frac{1}{1} \times \frac{1}{3} = \frac{1}{3}$

"When multiplying fractions, you can simplify either vertically (top and bottom) or by using cross simplification."

"If further simplification is not possible, multiply the numerators together and the denominators together."

Multiply mixed fraction by proper fraction.

$2\frac{2}{5} \times \frac{2}{3}$

$= \frac{\cancel{12}^{4}}{5} \times \frac{2}{\cancel{3}_{1}}$

$= \frac{8}{5} = 1\frac{3}{5}$

Multiply mixed fraction by mixed fraction.

$1\frac{2}{5} \times 1\frac{3}{7}$

$= \frac{\cancel{7}^{1}}{\cancel{5}_{1}} \times \frac{\cancel{10}^{2}}{\cancel{7}_{1}}$

$= 2$

Dividing fraction with whole number

$\frac{2}{3} \div 3$

$= \frac{2}{3} \times \frac{1}{3}$

$= \frac{2}{9}$

"When dividing a fraction by a whole number, change the division sign to a multiplication sign. When changing the sign, the whole number must be changed into its reciprocal. Every whole number is written as a fraction over 1."

Dividing fraction by fraction

$\frac{3}{5} \div \frac{9}{10}$

$= \frac{\cancel{3}^{1}}{\cancel{5}_{1}} \times \frac{\cancel{10}^{2}}{\cancel{9}_{3}} = \frac{2}{3}$

"When dividing a fraction by another fraction, change the division sign to a multiplication sign. When changing the sign, the second fraction must be changed into its reciprocal."

Unit 9 – Decimals and percentages

Decimals

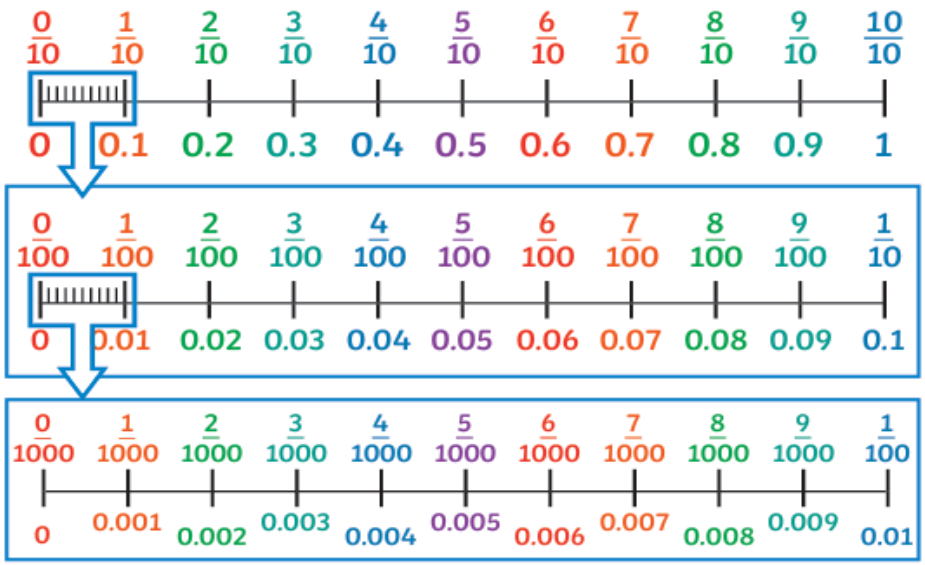
Knowledge Organiser

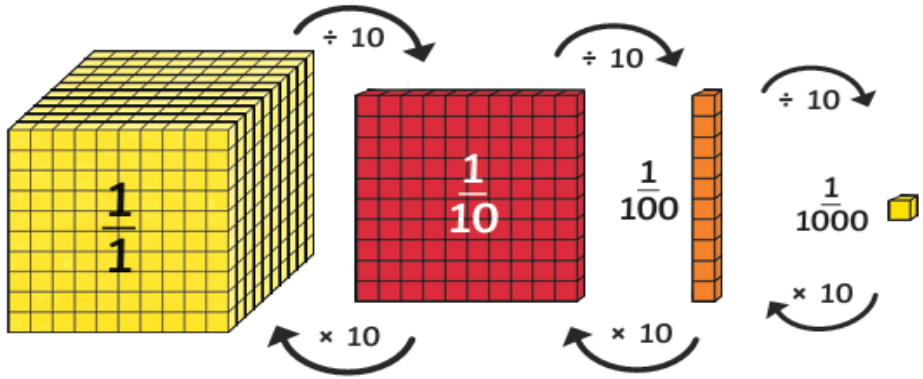
Key Vocabulary

- tenths
- hundredths
- decimal tenths
- decimal hundredths
- decimal equivalents
- part-whole model
- rounding
- decimal point
- place value

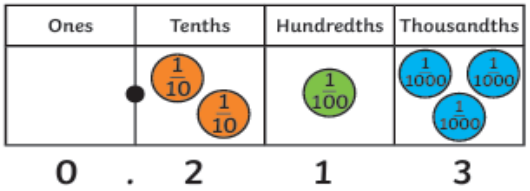
twinkl visit twinkl.com

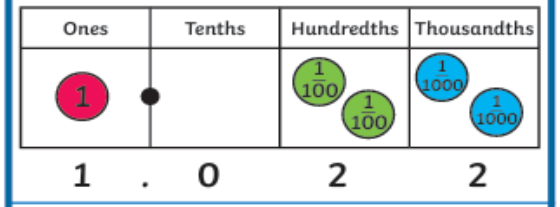
Tenths, Hundredths and Thousandths

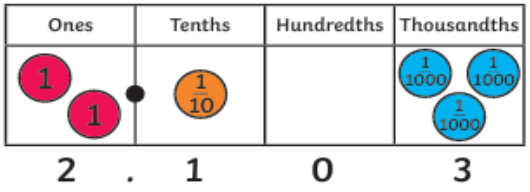




Order and Compare Numbers with Three Decimal Places







Decimal Numbers as Fractions

$$0.71 = \frac{71}{100} = \frac{7}{10} + \frac{1}{100}$$

$$0.37 = \frac{37}{100} = \frac{3}{10} + \frac{7}{100}$$

Decimals

Knowledge Organiser

Multiplying and Dividing by 10, 100 and 1000

Tens	Ones	Tenths	Hundredths	Thousandths
3	8			
	3	8		
3	8			

÷ 10 (3 8 → 3 8)

× 10 (3 8 → 3 8)

Tens	Ones	Tenths	Hundredths	Thousandths
3	8			
	0	3	8	
3	8			

÷ 100 (3 8 → 0 3 8)

× 100 (0 3 8 → 3 8)

Tens	Ones	Tenths	Hundredths	Thousandths
3	8			
	0	0	3	8
3	8			

÷ 1000 (3 8 → 0 0 3 8)

× 1000 (0 0 3 8 → 3 8)

Adding and Subtracting Decimals

0.8 + 0.001 = 0.801

1.031 - 0.23 = 0.801

0.4005 + 0.4005 = 0.801

Rounding Decimals

1 ← 1.1 1.2 1.3 1.4 | 1.5 1.6 1.7 1.8 1.9 → 2

If the tenths digit is 1, 2, 3 or 4, we round down to the nearest whole number.

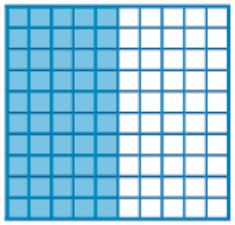
If the tenths digit is 5, 6, 7, 8 or 9, we round up to the nearest whole number.

1.1 ← 1.11 1.12 1.13 1.14 | 1.15 1.16 1.17 1.18 1.19 → 1.2

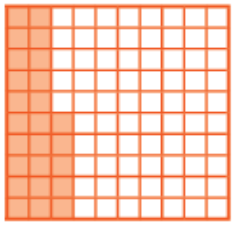
If the hundredths digit is 1, 2, 3 or 4, we round down to the nearest tenth.

If the hundredths digit is 5, 6, 7, 8 or 9, we round up to the nearest tenth.

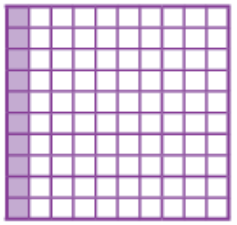
Percentage and Decimal Equivalents



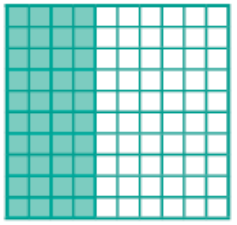
$50\% = \frac{50}{100} = \frac{1}{2} = 0.5$



$25\% = \frac{25}{100} = \frac{1}{4} = 0.25$



$10\% = \frac{10}{100} = \frac{1}{10} = 0.1$

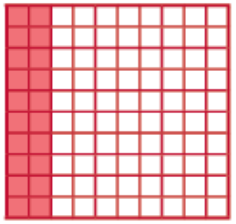


$40\% = \frac{40}{100} = \frac{2}{5} = 0.4$

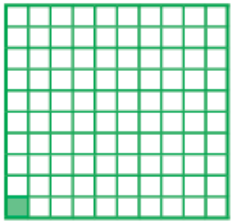
Crossing the Whole

0.82 + 0.63 = 1.45

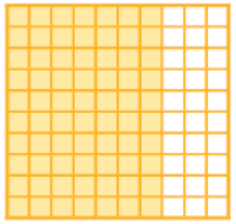
2.531 - 0.6 = 1.931



$20\% = \frac{20}{100} = \frac{1}{5} = 0.2$



$1\% = \frac{1}{100} = 0.01$



$70\% = \frac{70}{100} = \frac{7}{10} = 0.7$

Percentages

Percentages are numbers which are expressed as a fraction of 100.

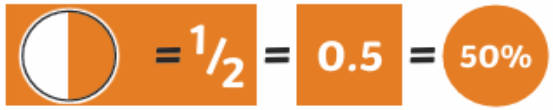
"Percent" means "number of parts per hundred".

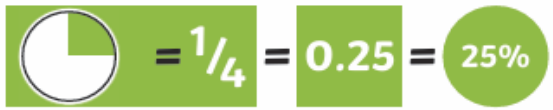
The symbol we use for percent is the percent sign %.

E.g.

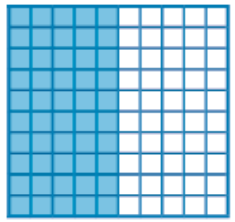
$43\% = \frac{43}{100}$ $1\% = \frac{1}{100}$ $18\% = \frac{18}{100}$

Decimals, Fractions and Percentages

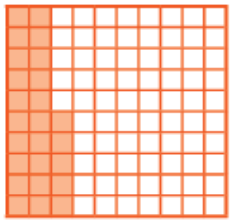




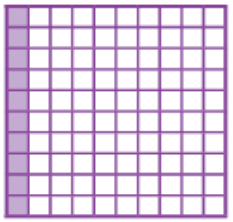
Percentage and Decimal Equivalents



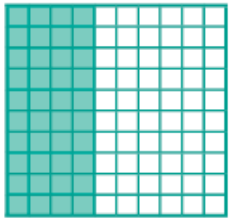
$50\% = \frac{50}{100} = \frac{1}{2} = 0.5$



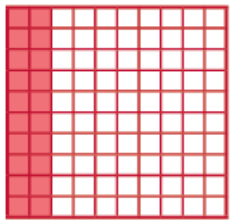
$25\% = \frac{25}{100} = \frac{1}{4} = 0.25$



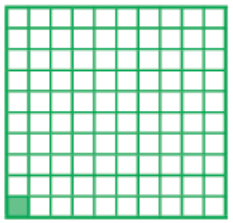
$10\% = \frac{10}{100} = \frac{1}{10} = 0.1$



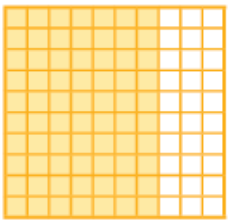
$40\% = \frac{40}{100} = \frac{2}{5} = 0.4$



$20\% = \frac{20}{100} = \frac{1}{5} = 0.2$

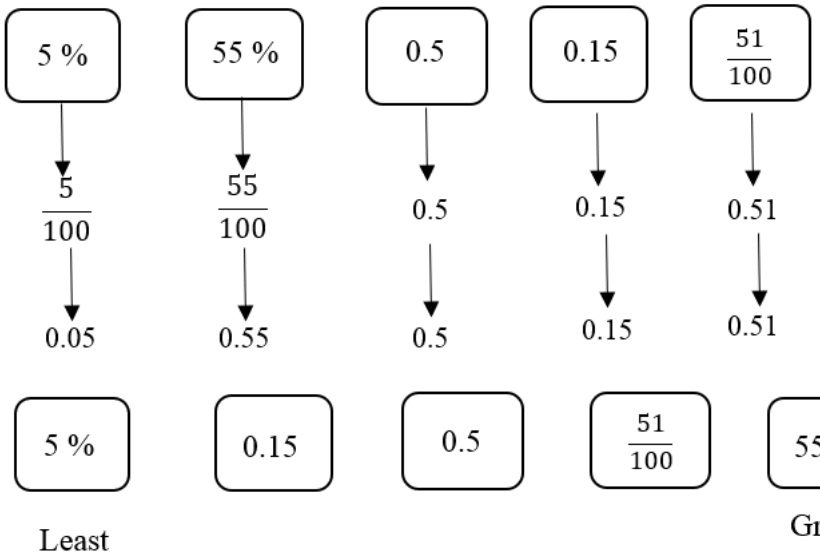


$1\% = \frac{1}{100} = 0.01$



$70\% = \frac{70}{100} = \frac{7}{10} = 0.7$

Arrange these numbers in order from least to greatest value.



When arranging decimals, percentages, and fractions, the numbers must first be converted into the same type before arranging them. However, the arrangement should be written using the original numbers only.

Rounding 1 decimal place.

To round a number to 1 decimal place, look at the second digit after the decimal point (the hundredths place). If it is (5) or more, round the first digit up by (1). If it is (4) or less, keep the first digit the same and remove the rest of the digits.

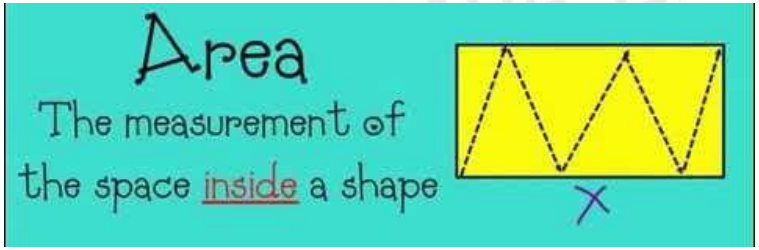
1.63 round to 1 decimal place is 1.6

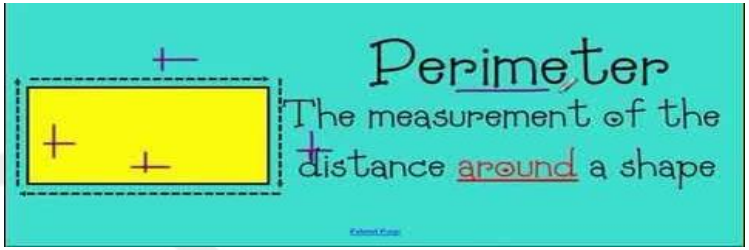
3.58 round to 1 decimal place is 3.6

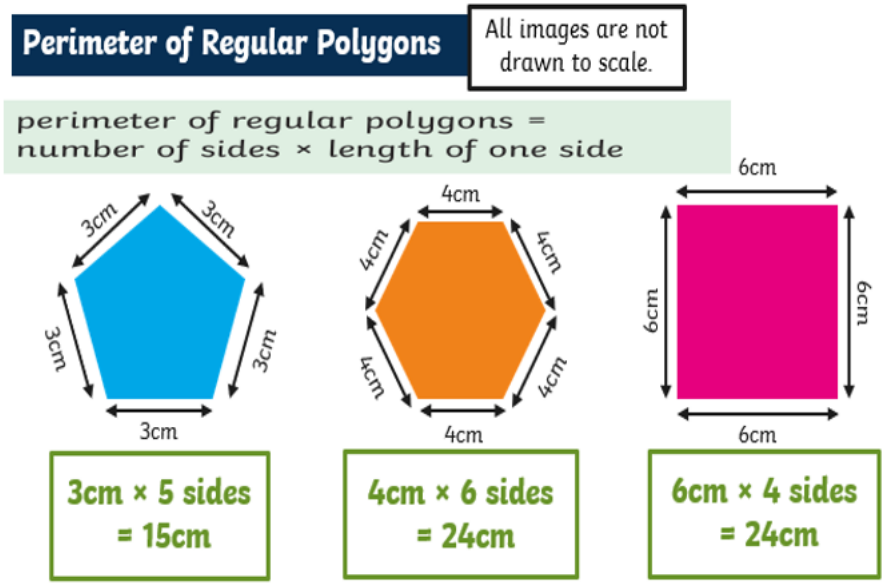
8.21 round to 1 decimal place is 8.2

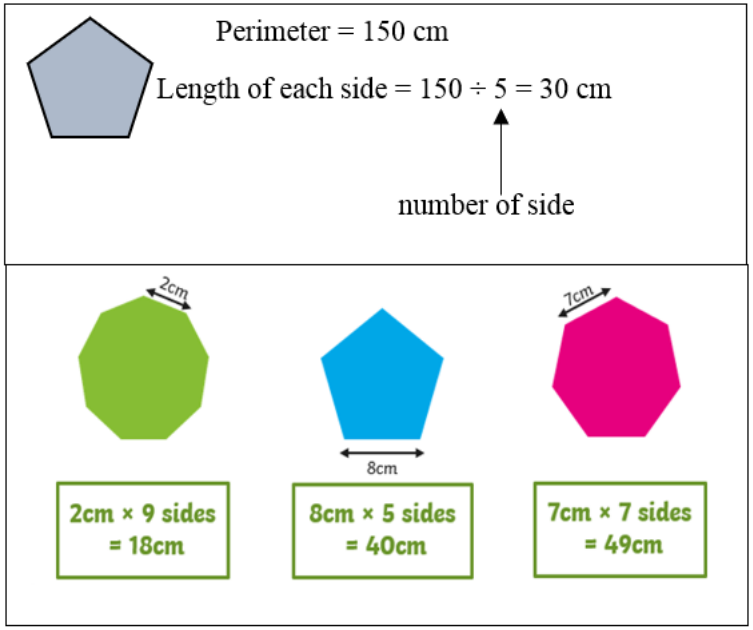
7.30 round to 1 decimal place is 7.3

Unit 10 – Measure perimeter and area









Area

Knowledge Organizer

Key Vocabulary

- area
- perimeter
- millimetres
- centimetres
- metres
- rectilinear
- squares
- length
- width

Area and Perimeter

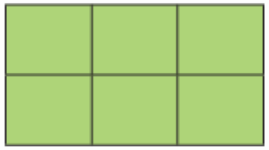
Area is the amount of space inside a 2D shape.

Perimeter is the total **distance** around the outside of a 2D shape.

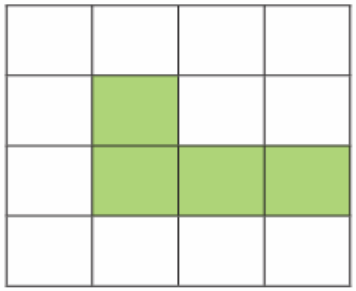
Measuring Area

We can count **squares** to find the **area** of a **rectilinear** shape.

Area = 1 square



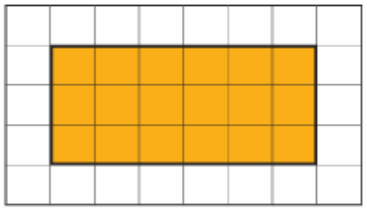
Area = 6 square



Area = 4 square

Calculating Area

- To calculate the area of a rectangle on a grid:

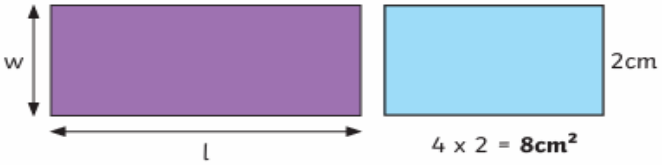


Multiply the length × width

= 6 × 3 = 18 squares.

- To calculate the area of a rectangle, use the formula:

length (l) x width (w) = area

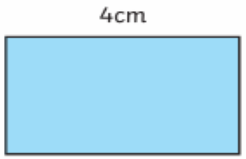


4 x 2 = **8cm²**

- To find the length of an unknown side, rearrange the formula to:

Area ÷ length of known side = length of unknown side

The area of this rectangle is 12cm².



The length of the unknown side is 3cm.

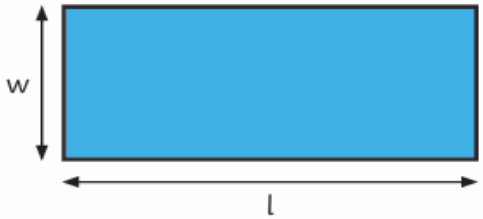
Perimeter and Area — Knowledge Organiser

Key Vocabulary

- metre
- kilometre
- perimeter
- length
- width
- rectangle
- rectilinear
- dimensions

Measure Perimeter

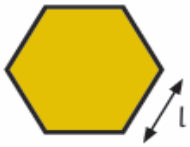
Measure the perimeter of a rectangle:



Measure the length (l) and width (w).

Perimeter = l + w + l + w or (l + w) × 2

Measure the perimeter of regular shapes:



Measure the length (l) and count the number of sides (s) on the shape.

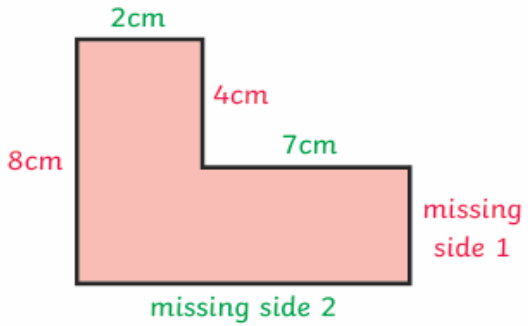
Perimeter = l × s

Measure the perimeter of irregular shapes:

Measure the length of each side and add them together.

Calculate Perimeter

Calculate the missing sides of this rectilinear shape to find the perimeter:



** This shape is not drawn to the dimensions specified.*

Missing side 1 + 4cm = 8cm,
so missing side 1 = 4cm.

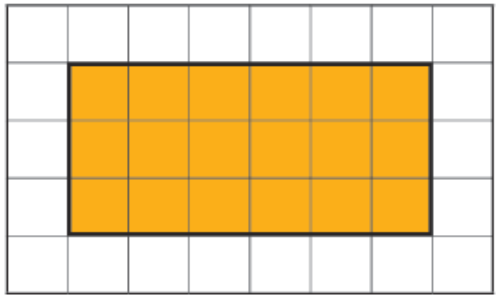
Missing side 2 = 2cm + 7cm = 9cm

Perimeter = sum of all sides =
2cm + 4cm + 7cm + 4cm + 9cm + 8cm = 34cm

Length and Perimeter — Knowledge Organiser

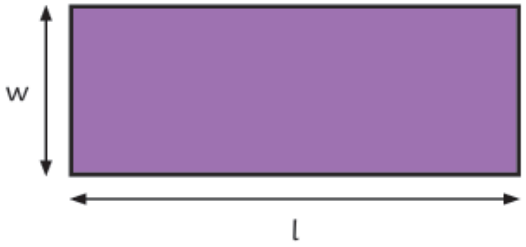
Area of Rectangles

The area of a rectangle on a grid:



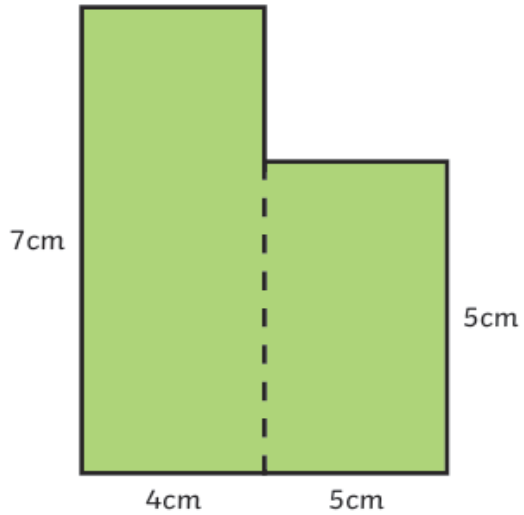
Multiply the length × width
= 6 × 3 = 18 squares.

The area of a rectangle = length (l) × width (w).



Area of Compound Shapes

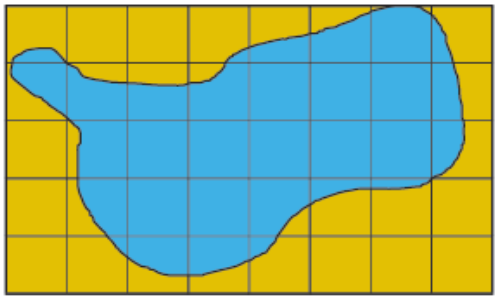
To find the area of a compound shape, divide the shape into rectangles with known dimensions:



Area = 7cm × 4cm + 5cm × 5cm
= 28cm² + 25cm²
= 53cm²

Area of Irregular Shapes

To find the area of an irregular shape, find the number of whole squares and part squares.



Whole squares = 10
Part squares = 22

Estimate of area = whole squares + half part squares

= 10cm² + 11cm² = 21cm²

*There are other ways to estimate the area of irregular shapes.

Unit 11- Graphs and tables

Type of graphs

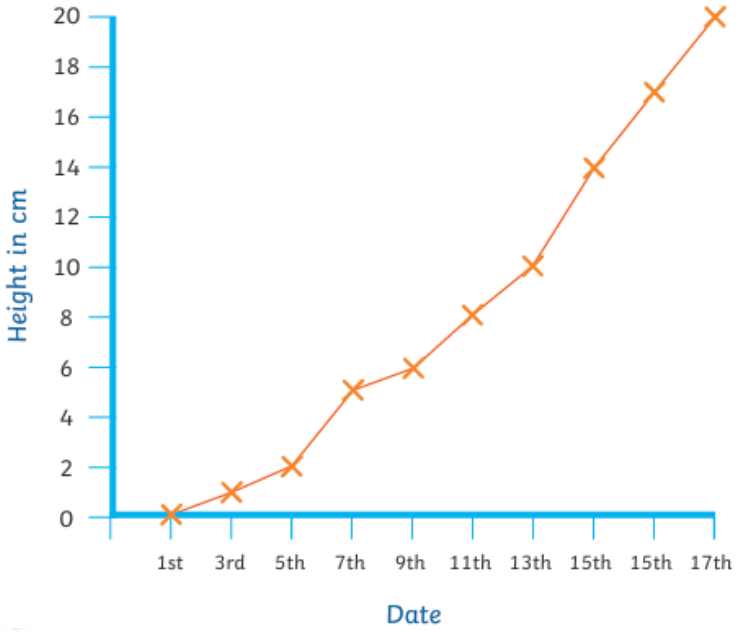
Tally Chart

A type of chart to collect data in.	This chart uses: Tally marks	What do I use a tally chart for? To record data quickly and efficiently. This data can then be used to create more detailed and visual graphs.

Line Graph

A line graph represents data using points connected by lines, to show how something changes in value over a period of time.	This graph uses: Numerical data	What data could I display on this type of graph? Temperatures in summer; Number of sales of ice creams; Growth rates of plants

Favourite Animal	Number of Children
Dog	𝍸 𝍸
Cat	𝍸 |||
Snake	||
Bear	||||
Horse	𝍸 |
Goose	



Histogram

A histogram displays data in rectangular bars, grouping numbers into ranges. The bars of the histogram touch because they represent continuous data.

This graph uses:

Numerical data

What data could I display on this type of graph?

Graphing the weight of a puppy

Sports scores

Height of different trees in a forest

Bar Graph

A bar graph uses rectangular bars to display data in different categories. The bars do not touch.

This graph uses:

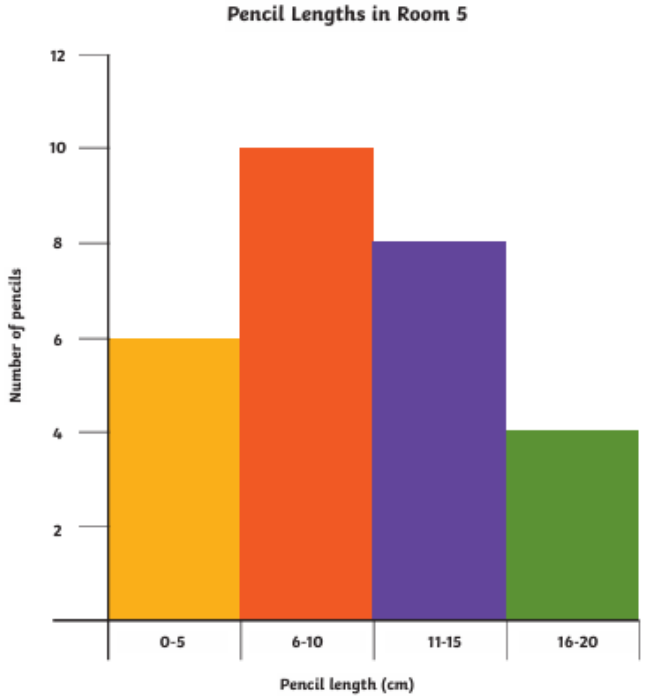
Categorical data

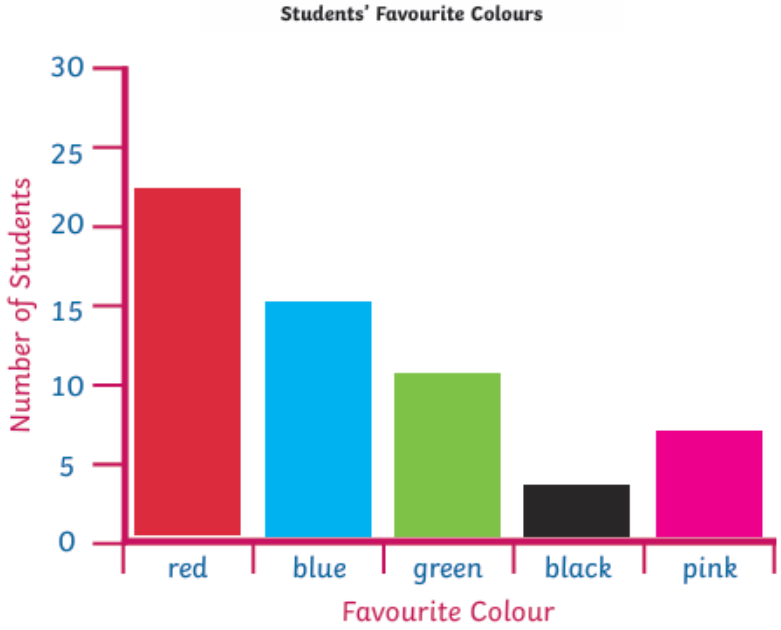
What data could I display on this type of graph?

Favourite fruits

Favourite movies

Least favourite ice cream flavour





Pie Graph

Pie graphs use segments to display data so that it is easier to make comparisons between categories.	**This graph uses:** Categorical data	**What data could I display on this type of graph?** Where your pocket money goes; Favourite type of movie; The reasons people use public transport

bikes, car, walk, bus, plane, boat, train

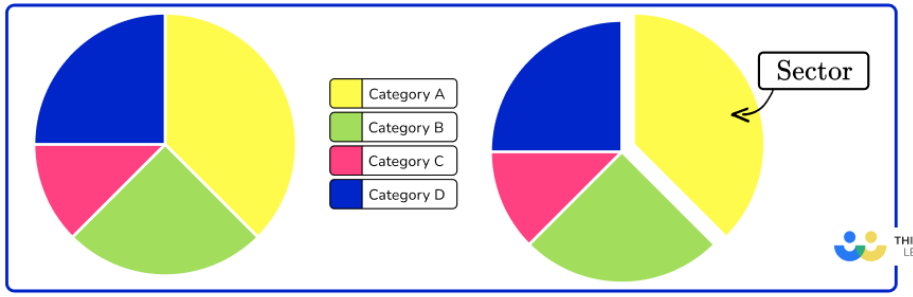
twinkl

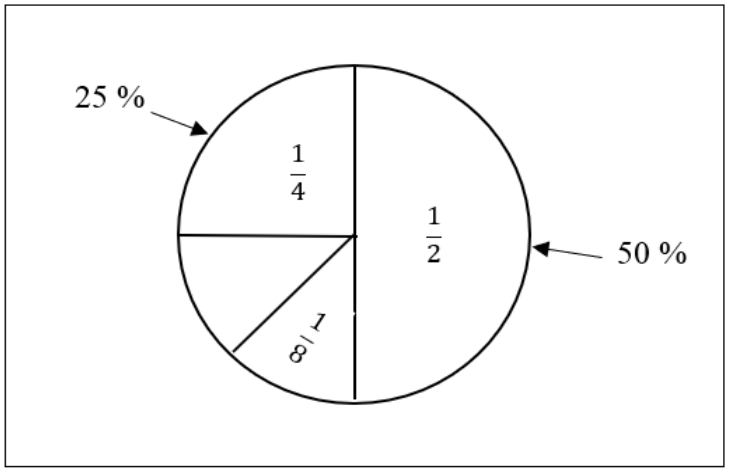
Pie Chart

A **pie chart** is a visual representation of all items of data within a data set.

The sectors (or number of slices) of a pie chart are proportional to the different items in the data set; the larger the sector (slice size), the higher the frequency of data in that category.

Data labels (or a key) should be used to make the pie chart easy to understand.





Statistics

Knowledge Organiser

Key Vocabulary

axis
continuous data
horizontal
data
interpret
label
line graph
maximum value
minimum value
pattern
predict
relationship
represent
scale
survey
table
tally
timetable
vertical
x-axis
y-axis

Reading and Understanding Two-Way Tables

A Two-Way Table to Show Ticket Prices at a Local Cinema

Ticket Type	Weekday Price	Weekend Price
Adult	£6	£7.50
Child	£4	£4.50
Student	£5.50	£6

In order to understand the data presented in a table, you must read the **title** and the **headings**. Remember to always look at the heading that **each piece of information** falls under.

Timetables

Here is a bus timetable.

three different buses

bus stop locations				
	Mill Road	0726		0842
	High Street	0729	0803	
	Pitsmoor Road	0759	0833	
	Fulwood	0845	0919	0946

Two-Way Tables

A Two-Way Table to Show the Favourite Drink Flavours of Some Children

	Boys	Girls	Total
Orange	8		18
Blackcurrant		6	
Total	15		

To find the number of boys who voted for blackcurrant, look at the total number of boys who voted and subtract the number of votes for orange.

To find the number of girls who voted for orange, look at the total number of votes for orange and subtract the number of votes from boys.

To find the total number of votes for blackcurrant, the total number of girls or the total number of voters, simply add the values from the appropriate row(s) or column(s).

The bus route terminates at this time and location.

The bus route starts at this time and location.

The bus does not stop here.

Statistics

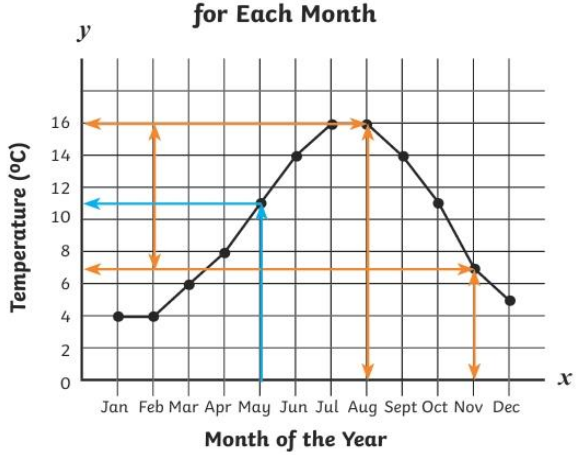
Knowledge Organiser

Read and Interpret Line Graphs

The points on the graph show the average temperature for each month.

The y-axis shows temperature on a scale from 0°C to 16°C, increasing in increments of 2°C.

A Line Graph Showing the Average Temperature for Each Month



The x-axis shows the months of the year.

To find the average temperature in May, follow the arrow up from May and across to the temperature. As this is halfway between 10°C and 12°C, the average temperature in May is 11°C.

To find the difference between the average temperatures in August and November, find the temperature for each month and calculate the difference between the two. The shape of the line graph can show how the temperature changed. The average temperature falls 9°C from August to November.

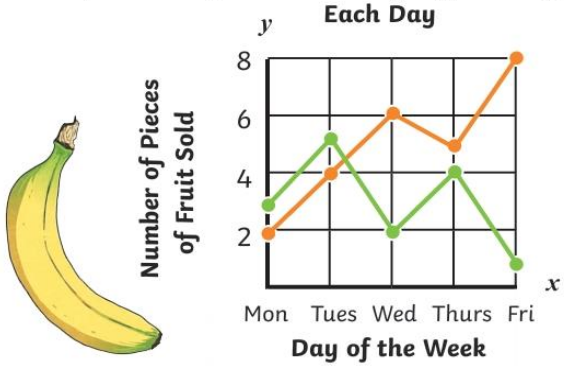
Draw Line Graphs

A Table Showing the Number of Different Types of Fruit Sold Each Day

	Bananas	Apples
Mon	2	3
Tues	4	5
Wed	6	2
Thurs	5	4
Fri	8	1

This graph can be used to represent the data from the table.

A Graph Showing the Number of Different Types of Fruit Sold Each Day



Mark each point for the number of apples sold each day. Join each point with a line.

Mark each point for the number of bananas sold each day. Join each point with a line.

Unit 12 -Geometry properties of shapes

Angles — Knowledge Organiser

Key Vocabulary	
angle	parallel
degree	opposite
interior	allied
exterior	co-interior
acute	supplementary
obtuse	alternate
reflex	corresponding
equal	polygon
straight line	quadrilateral
protractor	isosceles
triangle	equilateral

Types of Angles

acute (0° - 90°)

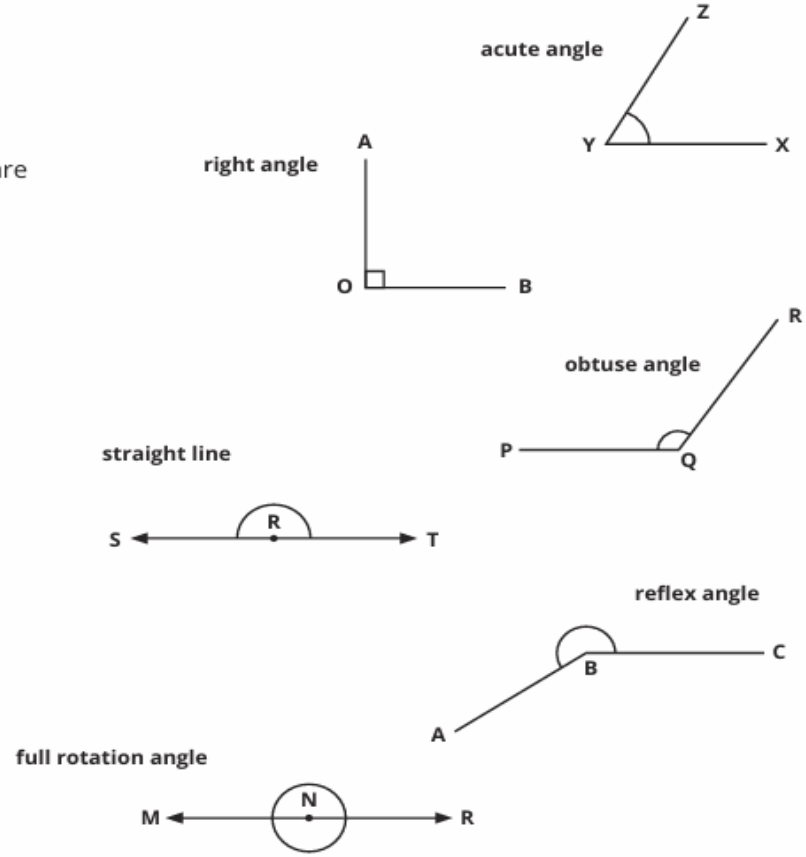
right angle (90°) These will always be shown with a square rather than a curve.

obtuse (90° - 180°)

straight line (180°)

reflex (180° - 360°)

full turn (360°)



Properties of Shape — Knowledge Organiser

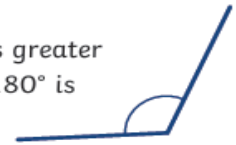
Identifying Angles

Acute Angles

Any angle that measures less than 90° is called an **acute** angle.

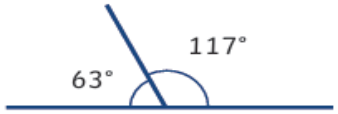
Obtuse Angles

Any angle that measures greater than 90° and less than 180° is called an **obtuse** angle.

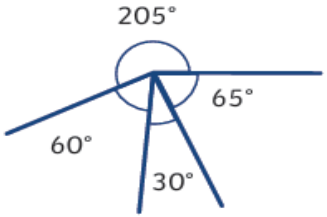


Reflex Angles

Any angle that measures greater than 180° is called a **reflex** angle.



Angles on a straight line always total 180°.

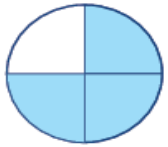


Angles around a point always total 360°.

Multiples of 90° can be used as descriptions of a turn.

$\frac{1}{4}$ turn = 90°

$\frac{1}{2}$ turn = 180°

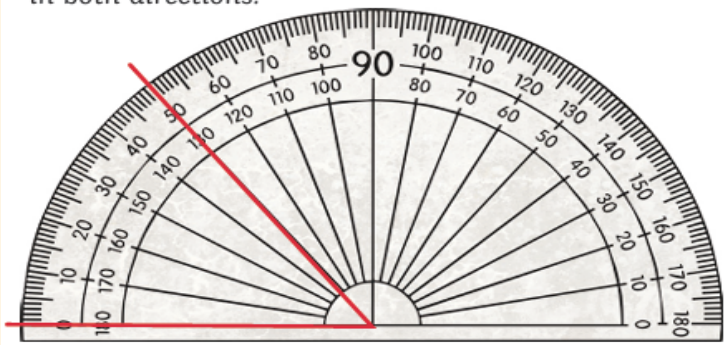


$\frac{3}{4}$ turn = 270°

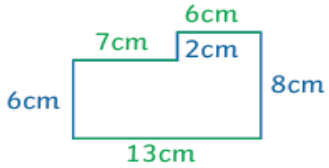
1 turn = 360°

Measuring and Drawing Angles

To measure angles, we use a protractor. Look carefully at how the numbers on the scale count from 0° to 180° in both directions.



Using Properties of Rectangles



6cm + 2cm = 8cm

7cm + 6cm = 13cm

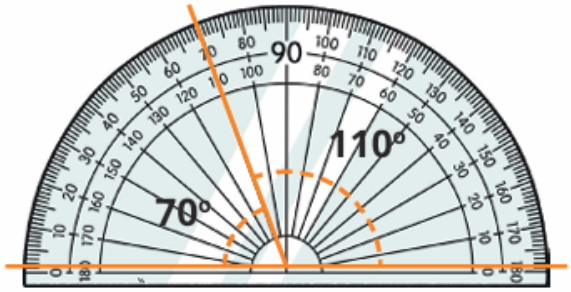
Measuring and Drawing Angles

Protractors are used to measure and draw **angles**.

To avoid mistakes when using a protractor, ensure you:

- Line up the protractor so the 0° line is at the start position.
- Read the size of the angle from 0°.

When measuring an angle, make sure the cross in the centre of the protractor lines up with the centre of the angle and 0° line with the line on the diagram.

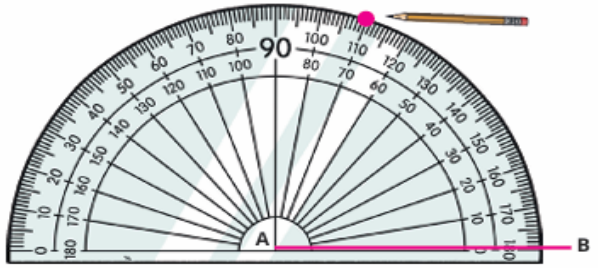


Measuring and Drawing Angles

Determine whether you need to read from the inner or outer scale by starting from zero.

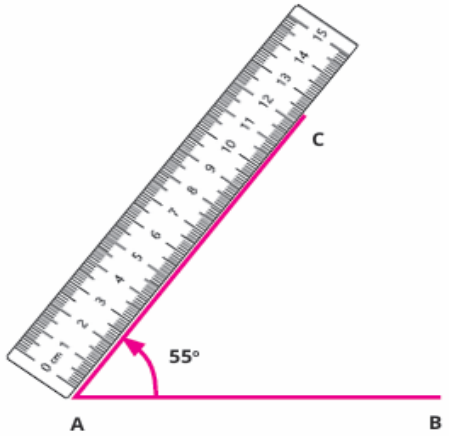
In this diagram, the correct size of the angle is 70° as the opening of the angle is on the left hand side and therefore we need to use the inner numbers as that starts on 0°.

When drawing angles, start with a straight line. Position the protractor so the cross of the protractor is at one end of the line and it lines up with the 0° line.



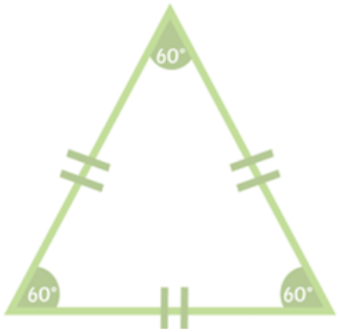
Making sure you are starting from zero, find the size of the angle you need and draw a dot. In this diagram we are drawing a 55° angle.

Then move the protractor away and join the dot to where you had the centre of the protractor.



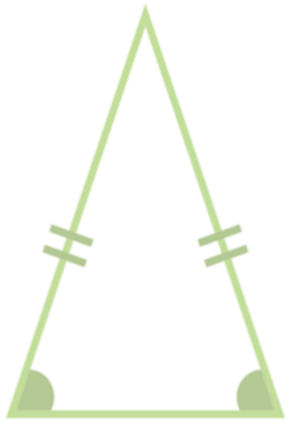
Types of **Triangles**

equilateral



3 equal sides
3 equal angles (60°)

isosceles

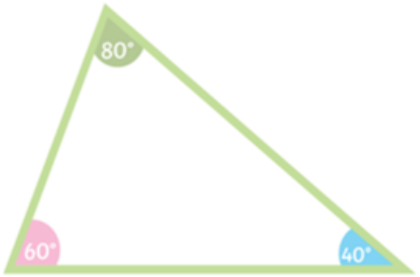


2 equal sides
2 equal angles

right

One angle is a right angle (90°).
Two other angles add up to 90°.
The longest side is called the hypotenuse.

scalene

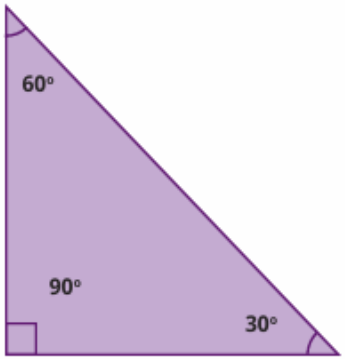


All sides are different.
All angles are different.

Angle Rules

Right Angle Triangle

1. Angles in a triangle always add up to 180°.

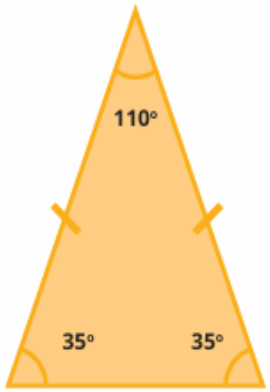


Right angled

One right angle

90 + 60 + 30 = 180°

Isosceles Triangle

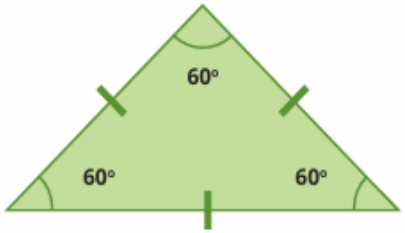


Isosceles

Two equal sides and two equal angles

35 + 35 + 110 = 180°

Equilateral Triangle

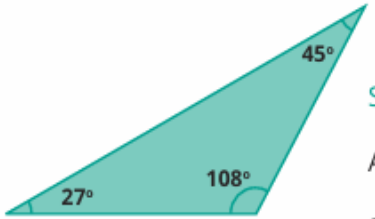


Equilateral

Three equal sides and three equal angles

60 + 60 + 60 = 180°

Scalene Triangle



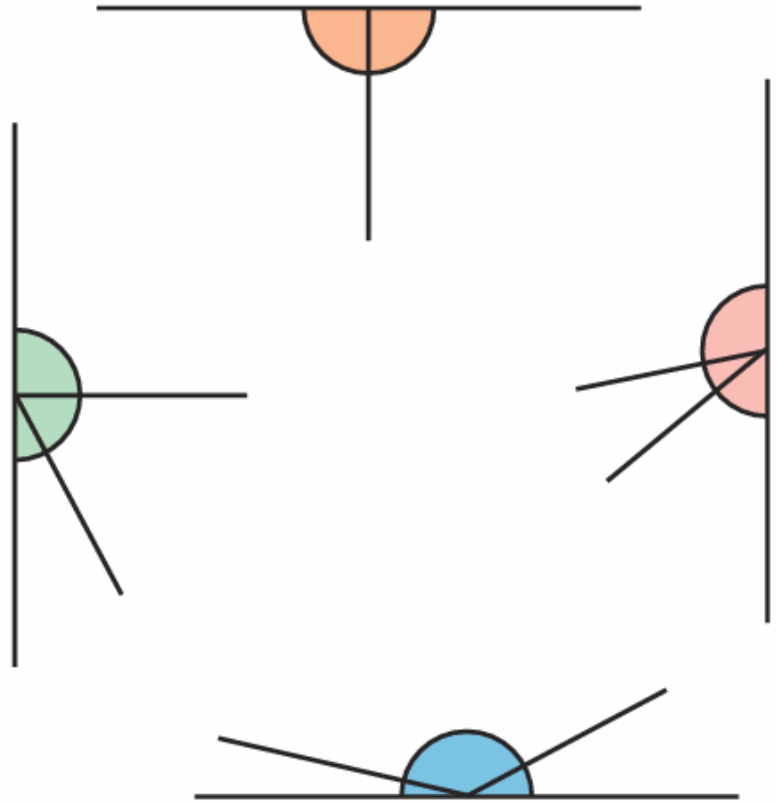
Scalene

All sides and angles different

27 + 45 + 108 = 180°

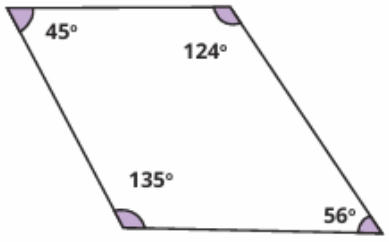
Angle Rules

2. Angles on a straight line always add up to 180°.



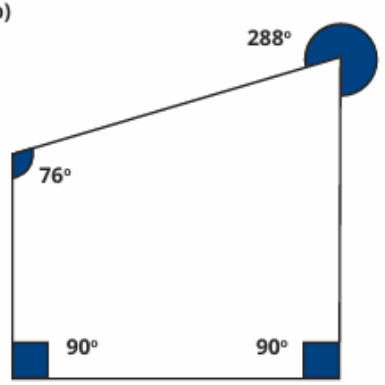
3. Angles in a quadrilateral always add up to 360°.

a)



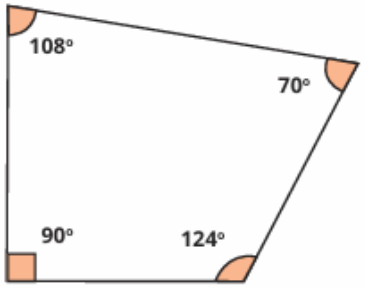
diagrams not to scale

b)



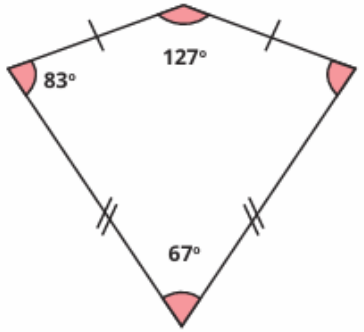
diagrams not to scale

c)



diagrams not to scale

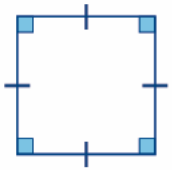
d)



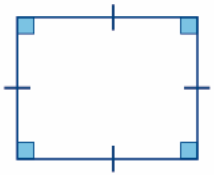
diagrams not to scale

Quadrilaterals

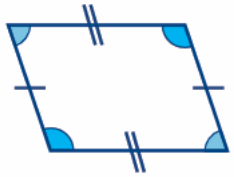
A quadrilateral is a polygon with four sides.



A square has four sides of equal length and four right angles (90°). A square is also a rectangle, a rhombus and a parallelogram.

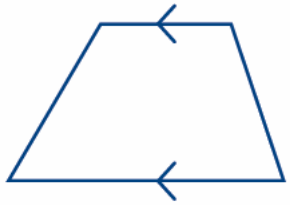


A rectangle has two pairs of parallel, equal sides and four right angles. A rectangle is also a parallelogram.

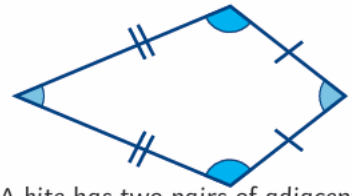


A parallelogram has two pairs of parallel, equal sides and opposite equal angles.

A rhombus has four sides of equal length and opposite equal angles. A rhombus is also a parallelogram.

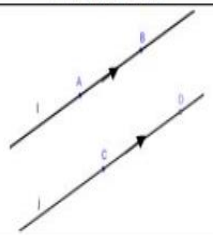
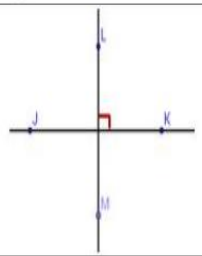


A trapezium only has one pair of opposite parallel sides.



A kite has two pairs of adjacent equal sides and one pair of opposite equal angles.

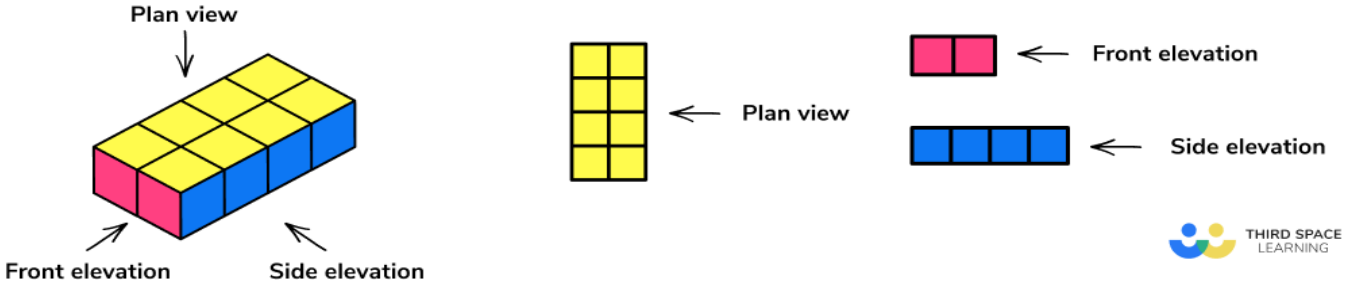
Types of Lines

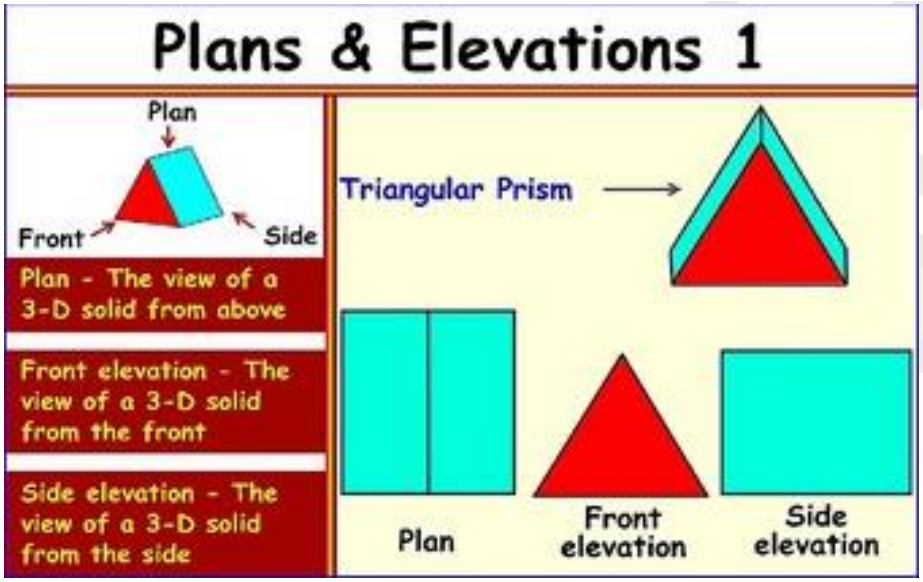
Characteristics	What You Draw	What You Say	What You Write
Parallel lines never cross and stay the same distance apart. They are coplanar. They have 0 points in common.		Line AB is parallel to line CD or line l is parallel to line j	$\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$ or line $l \parallel$ line j
Perpendicular lines intersect at right angles. They have one point in common.		Line LM is perpendicular to line JK.	$\overleftrightarrow{LM} \perp \overleftrightarrow{JK}$.

Plans and elevations

Plans and elevations are a way of representing a 3 dimensional shape on paper.
We have three views of the 3D shape:

- From the **front** of the shape, called the **front elevation**
- From the **side** of the shape, called **side elevation**
- From above **looking down** on the shape, called the **plan view**





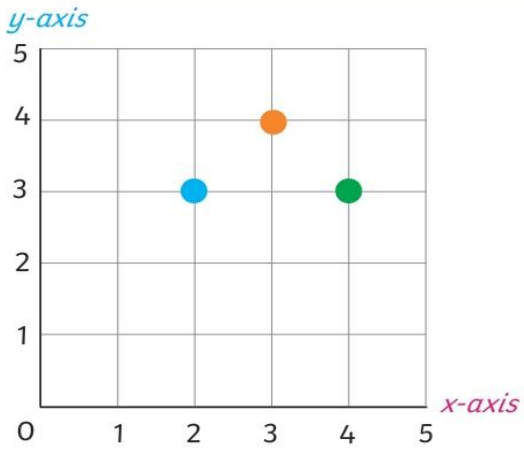
Unit 13- Geometry: position and direction

Position and Direction Knowledge Organiser

Key Vocabulary

- coordinate
- quadrant
- x-axis
- y-axis
- reflection
- mirror line
- translation
- horizontal
- vertical

Coordinates



We use coordinates to locate positions on a map or grid.

The numbers across the horizontal line of the grid are on the **x-axis**.

The numbers on the vertical line of the grid are on the **y-axis**.

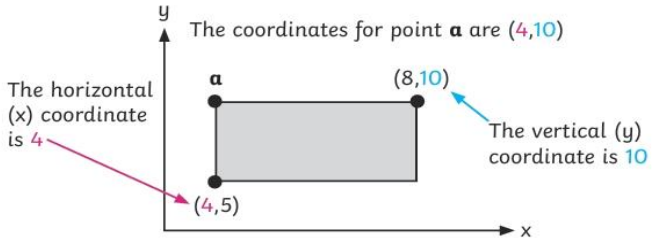
We always read or write the number on the x-axis before the y-axis.

The x and y positions are written in brackets with a comma.

The coordinate of the orange spot is **(3, 4)**.

Problem-Solving with Coordinates

Point **a** is in the same position along the x-axis as (4,5) and in the same position on the y-axis as (8,10).



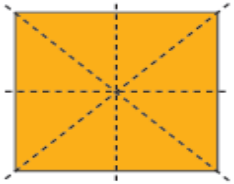
To help you remember which point to read or write first, simply remember to move '**along the corridor and up the stairs**'.

In other words, move on the **x-axis** and then move on the **y-axis**.

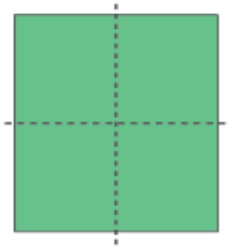
Lines of Symmetry

Lines of symmetry may be horizontal, vertical or diagonal. Some 2D shapes will have no lines of symmetry and some 2D shapes will have multiple lines of symmetry.

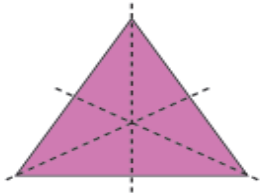
A square has four lines of symmetry.



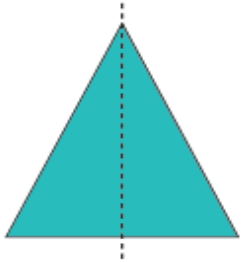
A rectangle has two lines of symmetry.



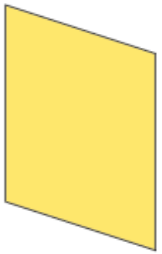
An equilateral triangle has three lines of symmetry.



An isosceles triangle has one line of symmetry.

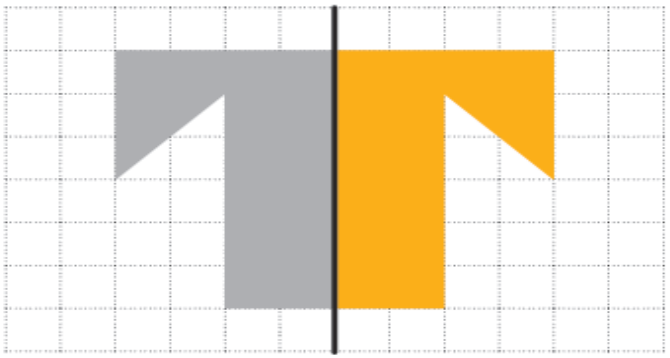


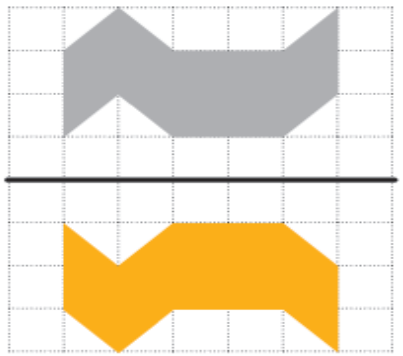
A parallelogram has no lines of symmetry.

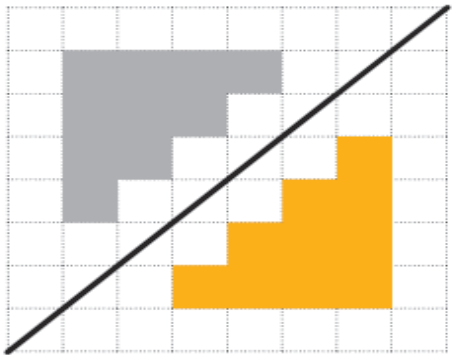


Symmetric Figures

Patterns and shapes can be reflected in a mirror line. Mirror lines can be vertical, horizontal or diagonal.







Position and Direction

Knowledge Organiser

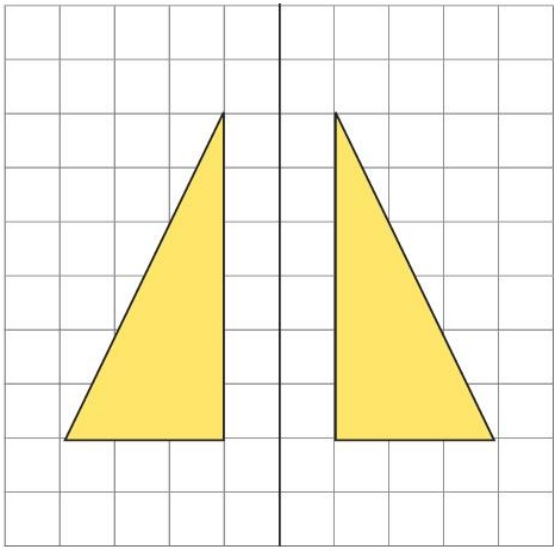
Reflection

A shape is reflected when it is flipped over a mirror line.

The reflected image is congruent to the original.

This means that the measurements of the sides and angles have not changed.

Each point of the reflected shape is the same distance from the mirror line as the original shape.

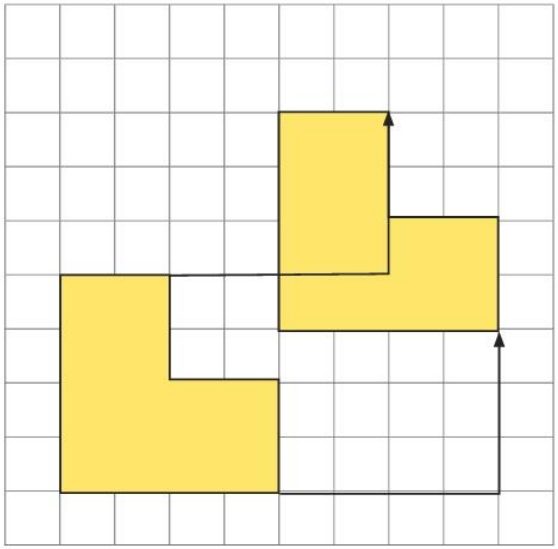


Translation

In maths, translation means moving an object on a grid.

The object is moved without changing the size, turning or reflecting it.

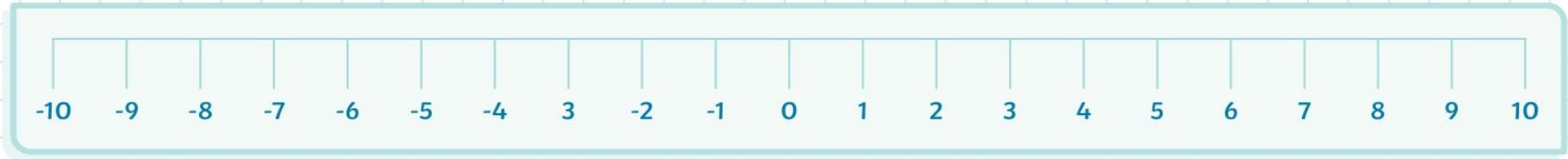
When translating an object on a grid, it can move up or down, left or right.



Unit-15 Negative numbers

What are negative numbers?

Negative numbers are numbers less than zero. They can be shown on a number line, like this:



For example, −3 is 3 less than zero. Can you find the difference between −8 and 4?

We can use negative numbers to represent a loss or a debt.

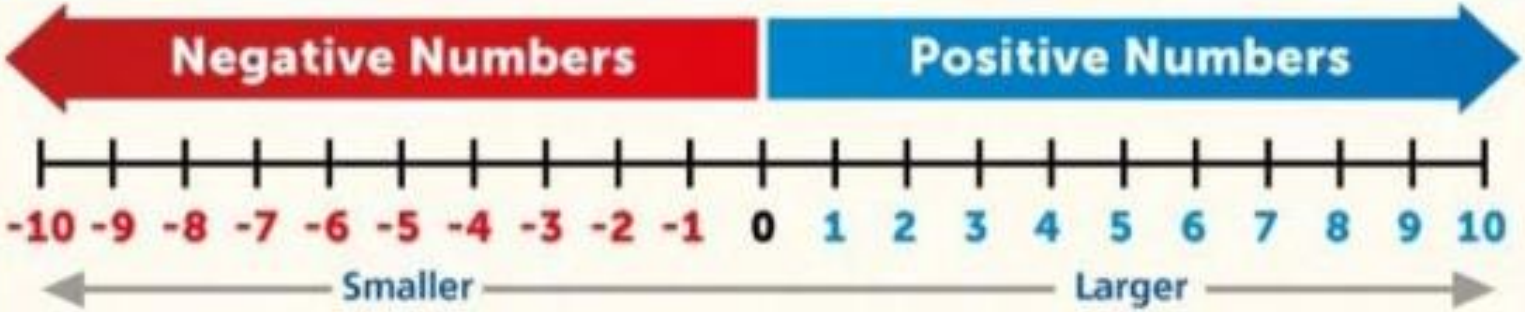
Negative numbers are used to show temperatures below zero (or below freezing, which is 0°C).

You might see negative numbers being used to label floors of a building below ground level.

Negative Numbers

A negative number is any number that is less than zero. Negative numbers are denoted by a minus sign, –.

The number line below shows the integers, or whole numbers, from -10 to 10.



Numbers to the **left** on a number line are smaller than those to their **right**. The value of negative numbers decreases from right to left. For example, –7 is less than –2.

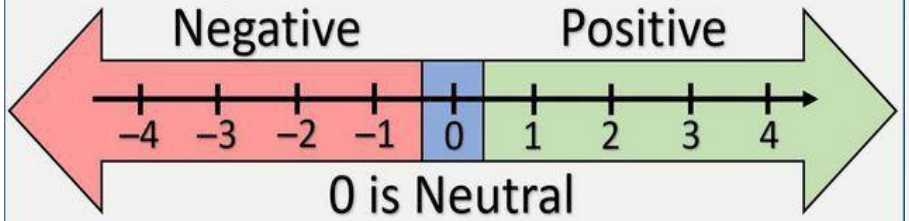
Real-life examples of negative numbers include:

Temperature | **Bank Balances**

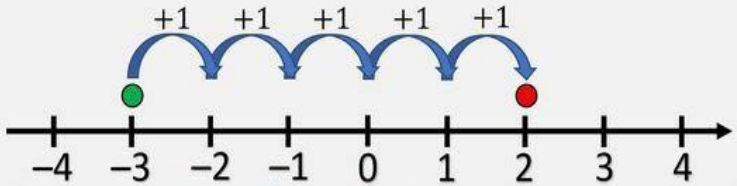
The following rules apply when adding or subtracting negative numbers.

Negative Numbers

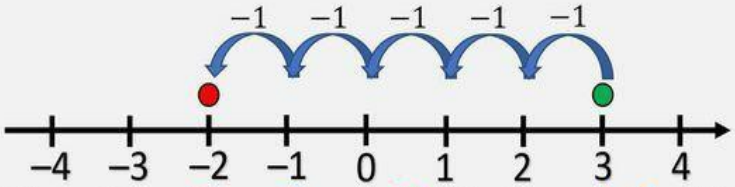
(Numbers less than zero)



0 is Neutral



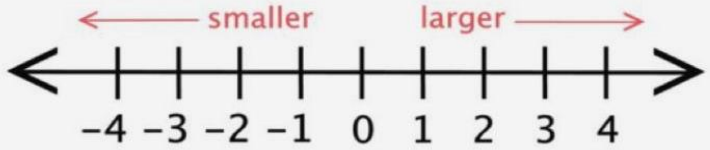
Addition: $-3 + 5 = 2$ (5 steps **right** of -3)



Subtraction: $3 - 5 = -2$ (5 steps **left** of 3)

Compare and Order Integers

Compare the signs as well as the size of the numbers.

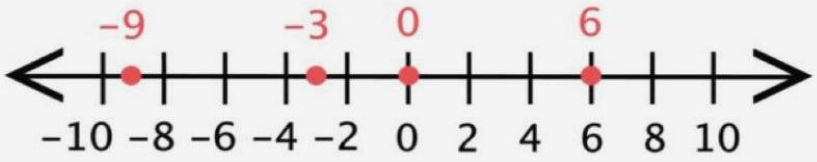


* Negative numbers are smaller than positive numbers. $-2 \lessdot 1$
* When both numbers are negative the larger size has a smaller value. $-4 \lessdot -2$

Order numbers according to where they are on the number line.

* Least to greatest ⟶ left to right
* Greatest to least ⟶ right to left

Example: Order the set $\{-9, 0, 6, -3\}$ from least to greatest



The order from left to right is −9, −3, 0, 6

Unit-16 Measure: converting units

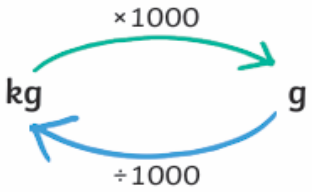
Converting Units — Knowledge Organiser

Key Vocabulary

- mass
- gram
- kilogram
- capacity
- volume
- millilitre
- centilitre
- litre
- millimetre
- centimetre
- kilometre

twinkl visit twinkl.com

Converting Mass



1000g = 1kg

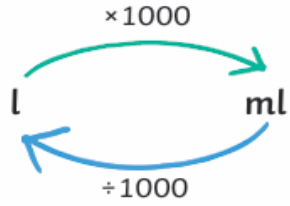
$\frac{1}{10}$kg = 0.1kg = 100g

$\frac{1}{4}$kg = 0.25kg = 250g

$\frac{1}{2}$kg = 0.5kg = 500g

$\frac{3}{4}$kg = 0.75kg = 750g

Converting Capacity



1000ml = 1 litre

$\frac{1}{10}$l = 0.1l = 100ml

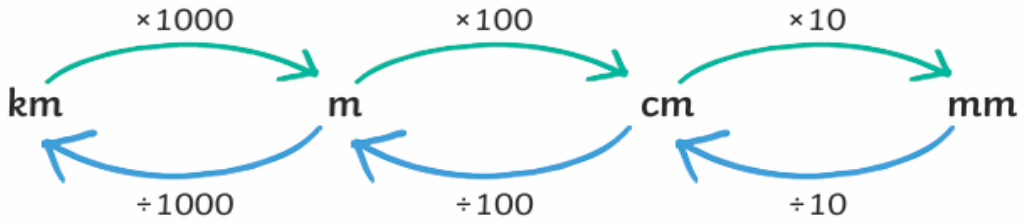
$\frac{1}{4}$l = 0.25l = 250ml

$\frac{1}{2}$l = 0.5l = 500ml

$\frac{3}{4}$l = 0.75l = 750ml

$\frac{1}{100}$l = 0.01l = 10ml

Converting Length



1000 metres = 1 kilometre

100cm = 1m

10mm = 1cm

$\frac{1}{10}$km = 0.1km = 100m

$\frac{1}{4}$km = 0.25km = 250m

$\frac{1}{2}$km = 0.5km = 500m

$\frac{3}{4}$km = 0.75km = 750m

kg to g (1 kg = 1,000 g)	**km to m** (1 km = 1,000 m)	**l to ml** (1 l = 1,000 ml)	**m to mm** (1 m = 1,000 mm)
3 kg = 3 x 1,000 = 3000 g	4 km = 4 x 1,000 = 4000 m	7 l = 7 x 1,000 = 7000 ml	5 m = 5 x 1,000 = 5000 mm
12 kg = 12 x 1,000 = 12,000 g	13 km = 13 x 1,000 = 13,000 m	38 l = 38 x 1,000 = 38,000 ml	63 m = 63 x 1,000 = 63,000 mm
1.5 kg = 1.5 x 1,000 = 1,500 g	1.7 km = 1.7 x 1,000 = 1,700 m	4.2 l = 4.2 x 1,000 = 4,200 ml	7.8 m = 7.8 x 1,000 = 7,800 mm
3.45 kg = 3.45 x 1,000 = 3,450 g	5.42 km = 5.42 x 1,000 = 5,420 m	5.78 l = 5.78 x 1,000 = 5,780 ml	2.25 m = 2.25 x 1,000 = 2,250 mm
g to kg (1 kg = 1,000 g)	**m to km** (1 km = 1,000 m)	**ml to l** (1 l = 1,000 ml)	**mm to m** (1 l = 1,000 ml)
5,000 g = 5,000 ÷ 1,000 = 5 kg	6,000 m = 6,000 ÷ 1,000 = 6 km	7,000 ml = 7,000 ÷ 1,000 = 7 l	9,000 mm = 9,000 ÷ 1,000 = 9 m
25,000 g = 25,000 ÷ 1,000 = 25 kg	46,000 m = 46,000 ÷ 1,000 = 46 km	29,000 ml = 29,000 ÷ 1,000 = 29 l	24,000 mm = 24,000 ÷ 1,000 = 24 m
3,700 g = 3,700 ÷ 1,000 = 3.7 kg	2,800 m = 2,800 ÷ 1,000 = 2.8 km	8,400 ml = 8,400 ÷ 1,000 = 8.4 l	8,300 mm = 8,300 ÷ 1,000 = 8.3 m
460 g = 460 ÷ 1,000 = 0.460 kg	280 m = 280 ÷ 1,000 = 0.280 km	530 ml = 530 ÷ 1,000 = 0.530 l	410 mm = 410 ÷ 1,000 = 0.410 m
m to cm (1 m = 100 cm)	**cm to m** (1 m = 100 cm)	**feet to inches** (1 foot = 12 inches)	**inches to feet** (1 foot = 12 inches)
4 m = 4 x 100 = 400 cm	500 m = 500 ÷ 100 = 5 cm	4 feet = 4 x 12 = 48 inches	36 inches = 36 ÷ 12 = 3 feet
12 m = 12 x 100 = 1200 cm	3,200 m = 3,200 ÷ 100 = 32 cm	10 feet = 10 x 12 = 120 inches	480 inches = 480 ÷ 12 = 40 feet
1.6 m = 1.6 x 100 = 160 cm	150 m = 150 ÷ 100 = 1.5 cm		
3.42 m = 3.42 x 100 = 342 cm	672 m = 672 ÷ 100 = 6.72 cm		

yard to feet (1 yard(yd) = 3 feet) 2 yard = 2 x 3 = 6 feet 30 yard = 30 x 3 = 90 feet	**feet to yard** (1 yard (yd) = 3 feet) 12 feet = 12 ÷ 3 = 4 yard 42 feet = 42 ÷ 3 = 14 yard	**pound to ounces** **(1 pound (lb) = 16 ounces(oz))** **(½ lb = 16 ÷ 2 = 8 oz)** **(¼ lb = 16 ÷ 4 = 4 oz)** 4 lb = 4x16 = 64 oz	**ounces to pound** **(1 pound (lb) = 16 ounces(oz))** 32 oz = 32 ÷ 16 = 2 lb
stone to pound **(1 stone (st) = 14 pound(lb))** 5 st = 5 x 14 = 70 lb	**pound to stone** **(1 stone (st) = 14 pound(lb))** 42 lb = 42 ÷ 14 = 3 st	**kg to lb** (1 kg = 2.2 lb) 2 kg = 2.2 x 2 = 4.4 lb	**pint to ml** (1 pint = 570 ml) 2 pint = 2 x 570 = 1140 ml 2 litre 280 ml = 2280 ml = 4 pints

1 pint	2 pints	3 pints	4 pints	5 pints	6 pints	7 pints	8 pints
570 ml	1,140 ml	1,710 ml	2,280 ml	2,850 ml	3,420 ml	3,990 ml	4,560 ml

Converting Units

Knowledge Organiser

Units of Time

Minute

1 minute = 60 seconds

Hour

1 hour = 60 minutes

Day

1 day = 24 hours

Week

1 week = 7 days

Fortnight

1 fortnight = 2 weeks

Month

Year

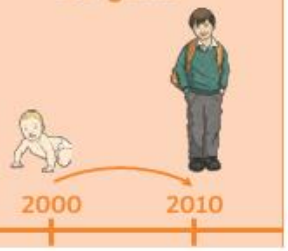
1 year =
12 months =
52 weeks =
365 days

Leap Year

1 leap year =
366 days

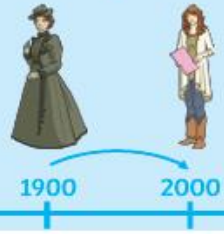
Decade

1 decade =
10 years



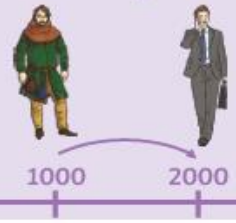
Century

1 century =
100 years



Millennium

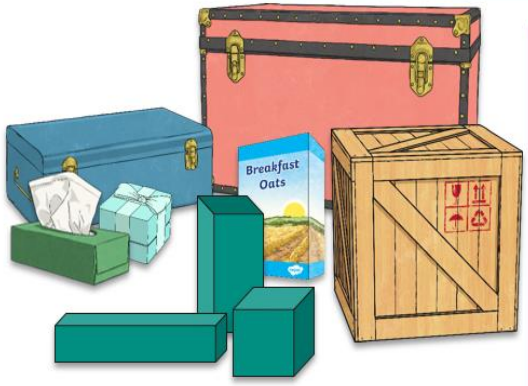
1 millennium =
1000 years



Unit-17 Measure volume

What Is Volume?

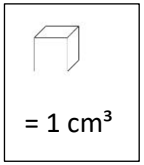
Volume = the amount of 3D space taken up by something.



When measuring the volume of a fixed object (where the shape doesn't change), we use cubic units. Today we are going to use cubic centimetres and cubic metres to measure and estimate the volume of cubes and rectangular prisms.

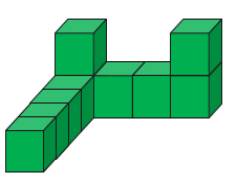
What Is Volume?

We can find the volume of these objects made from $1cm^3$ multilink cubes by counting the number of $1cm^3$ cubes that make up each shape.

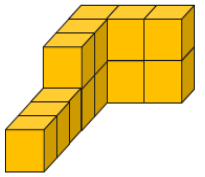


= 1 cm^3

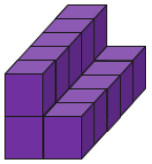
Remember that some shapes have cubes that are hidden from sight!



$10cm^3$



$13cm^3$



$15cm^3$

Volume — Knowledge Organiser

Key Vocabulary

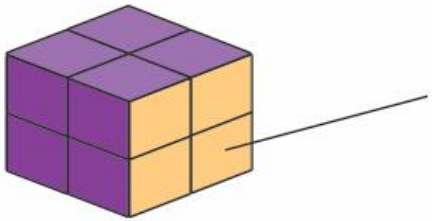
- cubed
- area
- cross-section
- prism
- cube
- cuboid
- face
- length
- height
- width
- depth

Volume of Cubes and Cuboids

Volume is measured in cubed units. For example, **cm³**, **m³** and **km³**.

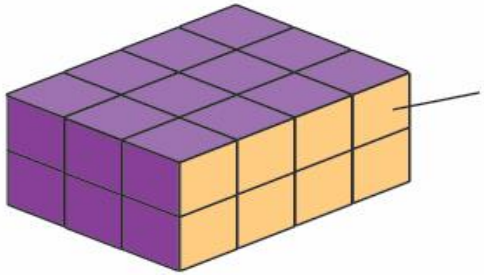
To calculate the volume of cubes and cuboids:

1. Calculate the area of the cross-section (one face).
2. Multiply the area of the cross-section (one face) by its depth.



Area of cross section (face) = 2cm × 2cm = $4cm^2$

$4cm^2$ × 2cm = Volume of $8cm^3$

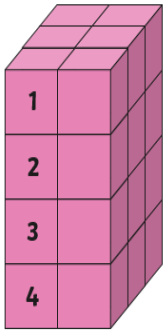


Area of cross section (face) = 4cm × 2cm = $8cm^2$

$8cm^2$ × 3cm = Volume of $24cm^3$

Calculating Volume of Cubes and Rectangular Prisms

We can calculate the volume of cubes and rectangular prisms by counting cubes in layers:



In the top layer, there are 6 cubes (3 × 2).

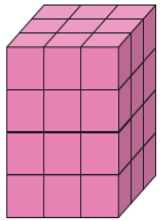
There are 4 layers.

$3 \times 2 \times 4 = 24$

If each cube were a cubic centimetre, this would be 24 cubic centimetres, which we could write as $24cm^3$.

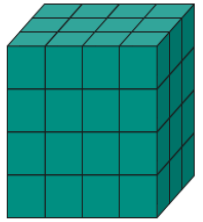
Calculating Volume of Cubes and Rectangular Prisms

Count the top layer of each object and calculate the volume. The unit measurement is shown underneath.



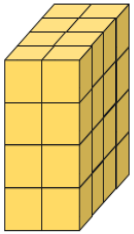
cubic centimetres

$36cm^3$



cubic metres

$48m^3$



cubic centimetres

$32cm^3$

References

https://www.twinkl.com.mm/

https://qualifications.pearson.com/

Teacher made worksheet