

Mathematics Revision Guide

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1 Introduction

This Mathematics Revision Guide has been written for children following the 11+ Online programme. This is a highly useful resource, which should be understood and absorbed, as it will undoubtedly assist in doing well in the 11+ practice tests and mock exams.

Many children are often stressed by the prospect of Mathematics revision and simply do not know where to start. This guide is a good place to commence building your knowledge around the major areas of Maths that is tested in exams, SATS and 11+ exams.

Maths revision, unlike other subjects, is a process through which you can broaden your knowledge of the mathematical principles required to do well in this subject area. By following this guide, you can transform your mathematical learning and subsequently achieve success in the 11+ online practice and testing programme.

Memorisation of formulae is not enough; you will need to know how to apply this knowledge when solving mathematical problems. The 11+ online programme will provide ample practice in applying the principles set out in this guide and drive you to success.

It is a fact that the best way you can hone your mathematical learning skills is to attempt as many past papers as possible and cover all areas of the 11+ syllabus extensively. The 11+ online programme will provide daily practice to raise your confidence and prepare you to tackle 11+ exam, with 12 Full Mock Exams to help build your knowledge, skill and confidence.

2 Multiplication Tables

Children should at least memorise up to and including the 12 times table

x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
3	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60
4	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80
5	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
6	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120
7	7	14	21	28	35	42	49	56	63	70	77	84	91	98	105	112	119	126	133	140
8	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120	128	136	144	152	160
9	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135	144	153	162	171	180
10	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
11	11	22	33	44	55	66	77	88	99	110	121	132	143	154	165	176	187	198	209	220
12	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240
13	13	26	39	52	65	78	91	104	117	130	143	156	169	182	195	208	221	234	247	260
14	14	28	42	56	70	84	98	112	126	140	154	168	182	196	210	224	238	252	266	280
15	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300
16	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240	256	272	288	304	320
17	17	34	51	68	85	102	119	136	153	170	187	204	221	238	255	272	289	306	323	340
18	18	36	54	72	90	108	126	144	162	180	198	216	234	252	270	288	306	324	342	360
19	19	38	57	76	95	114	133	152	171	190	209	228	247	266	285	304	323	342	361	380
20	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400

3 Square & Cube Numbers

Children should memorise the square and cube numbers. You should also be aware the inverse is true e.g. cube root and square root numbers.

Number	Square	Cube
1	1	1
2	4	8
3	9	27
4	16	64
5	25	125
6	36	216
7	49	343
8	64	512
9	81	729
10	100	1000
11	121	1331
12	144	1728
13	169	2197
14	196	2744
15	225	3375
16	256	4096
17	289	4913
18	324	5832
19	361	6859
20	400	8000

4 Conversions

Wealth of information relating to conversion factors

MASS/WEIGHT		
1000 milligrams (mg)	=	1 gram (g)
1000 grams (g)	=	1 Kilogram (Kg)
1000 Kilograms (Kg)	=	1 Tonne (t)
30 grams (g)	=	1 ounce (oz)
16 ounces (oz)	=	1 pound
14 pounds (lbs)	=	1 stone
112 pounds (lbs)	=	1 CWT (hundredweight)

LENGTH		
10 millimetres (mm)	=	1 centimetre (cm)
1000 millimetres (mm)	=	1 metre (m)
100 centimetres (cm)	=	1 metre (m)
1000 metres (m)	=	1 Kilometre (Km)
100000 centimetres (cm)	=	1 Kilometre (Km)
12 inches	=	1 foot
3 feet	=	1 yard
220 yards	=	1 furlong
8 furlongs	=	1 mile
1760 yards	=	1 mile
10000 sq m	=	1 hectare
100 hectares	=	1 sq km

CAPACITY		
10 millilitres (ml)	=	1 centilitre (cl)
1000 millilitres (ml)	=	1 litre (L)
100 centilitres (cl)	=	1 litre (L)
1000 cubic centimetres (cm ³)	=	1 litre (L)
20 fluid ounces	=	1 pint
2 pints	=	1 quart
8 pints	=	1 gallon
4.5 litres	=	1 gallon

TIME		
60 seconds (s)	=	1 minute (min)
60 minutes (min)	=	1 hour (hr)
24 hours (hr)	=	1 day
3600 seconds (s)	=	1 hour (hr)
86400 seconds (s)	=	1 day
14400 minutes (min)	=	1 day
7 days	=	1 week
1000 years (yr)	=	1 millennium
100 years (yr)	=	1 century
10 years (yr)	=	1 decade
365 days	=	1 year
366 days (every four years)	=	1 leap year
12 months	=	1 year
52 weeks	=	1 year

MONTHS		
Feb	=	28 days
Feb in leap year	=	29 days
Apr, Jun, Sep and Nov	=	30 days
Jan, Mar, May, Jul, Aug, Oct, Dec	=	31 days

QUANTITIES		
A dozen	=	12
A gross	=	12 dozen (144)
A score	=	20

ESTIMATES		
Length of a pencil	=	15 cm
Length of A4 paper	=	30cm
width of a single bed	=	1m
Mug of tea	=	250ml
A can of drink	=	330ml
A bottle of squash	=	1 litre
A can of beans	=	500g
A bag of sugar	=	1Kg

Note: Some Special Conversions

$$100\text{mm}^2 \rightarrow 1\text{cm}^2$$

$$1000000\text{mm}^2 \rightarrow 1\text{m}^2$$

$$10000\text{cm}^2 \rightarrow 1\text{m}^2$$

$$1000000\text{m}^2 \rightarrow 1\text{km}^2$$

5 Averages, Decimals, Fractions & Percentages

These terms are mathematical expressions, usually representing the division of one whole number by another. The table below illustrates some of the most common used.

Fraction: usually two numbers separated by a horizontal or diagonal line. For example $\frac{1}{2}$ is one half.

The 1 is known as the Numerator and represents how many parts

The 2 is known as the Denominator and represents the total number of parts

In this example $\frac{1}{2}$ represents one part out of a total of two parts.

The larger the denominator of a fraction, the smaller its value because it has been split into more parts. See table below:

One Whole or 1 or $\frac{2}{2}$ or $\frac{3}{3}$							
One Half				$\frac{1}{2}$			
One Third		$\frac{1}{3}$			$\frac{1}{3}$		
One Quarter		$\frac{1}{4}$		$\frac{1}{4}$		$\frac{1}{4}$	
One Fifth		$\frac{1}{5}$		$\frac{1}{5}$		$\frac{1}{5}$	
One Sixth		$\frac{1}{6}$		$\frac{1}{6}$		$\frac{1}{6}$	
One eighth	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$

Proper Fraction is where the Numerator is smaller than the Denominator e.g. $\frac{4}{5}$

Improper Fraction is where the Numerator is larger than the Denominator e.g. $\frac{5}{4}$ (top heavy and greater than 1)

To change $2\frac{5}{8}$ to an Improper Fraction: Multiply the denominator by the whole number and add the numerator:

Improper Fraction = $(2 \times 8) + 5 = 21$ = the new numerator, whereas the denominator stays constant $\frac{21}{8}$

Decimal: is a fraction written in a special form e.g. $\frac{1}{2} = 0.5$

9758.624 has been written to three decimal places, where the numbers to the left of the decimal place are recognised as whole numbers:

9 = Thousands, 7 = Hundreds, 5 = Tens and 8 = Units.

Similarly the numbers to the right of the decimal place are considered decimal places (less than a whole number) and are recognised as:

6 = tenths, 2 = hundredths, 4 = thousandths

In rounding decimals up or down, the rule is to round up when the integer is 5 and above and down when lower than 5.

Percentage: is a number or ratio expressed as a fraction of 100 (a whole) and is indicated by the sign %. A whole is 100%. The table below brings together the relationship and some of the more common fractions, decimals and percentages that should be memorised.

Fractions	Decimals	Percentage
1/2	0.50	50.00%
1/4	0.25	25.00%
3/4	0.75	75.00%
1/5	0.20	20.00%
1/6	0.167	16.67%
1/8	0.125	12.50%
1/10	0.10	10.00%
1/3	0.33	33.33%
2/3	0.67	66.67%
3/8	0.375	37.50%
5/8	0.625	62.50%
1/100	0.01	1.00%

Converting a fraction into a %

Example: Convert $\frac{3}{4}$ into a percentage

$$\frac{3}{4} \times 100 \text{ (multiply the fraction by 100)} = \frac{300}{4} = 75\%$$

Converting a % into a fraction

Example: $12.5\% \div 100$ (multiply both numbers by 2) = $25 \div 200 = \frac{1}{8}$

$$3.33\% \div 100 \text{ (multiply both numbers by 3)} = \frac{10}{300} = \frac{1}{30}$$

Converting a % into a decimal

Example: convert 25% into a decimal

$$25\% \div 100 = 0.25 \text{ (conversely multiple decimal } \times 100 \text{ to get \%)}$$

Converting a fraction into a decimal

Example: $\frac{7}{10}$ (Divide 7 by 10) to convert into a decimal = 0.7

Converting a decimal into a fraction

Example: 0.7 (we look at the position after the decimal point. The 7 is a tenth)

Hence because it's a tenth we say $\frac{7}{10}$; if it was 0.007 (thousandths) we say $\frac{7}{1000}$

Ratios can also be used like percentages to compare selected quantity with the whole. For example 3 out of 4 children like strawberry ice cream. The *Ratio* will be written as 3:4 (numerator on the left and the denominator on the right), the fraction as $\frac{3}{4}$, the decimal as 0.75 and the percentage as 75%.

Ratios

As explained above ratio is another way of comparing the selected quantity with the whole.

Example: 144 party balloons were shared 28 boys and 30 girls by Ben, the party boy. If Ben gave the boys 6 balloons each in their party bag, how many balloons did he place in the girls party bags?

We know the ratio, which is 28:30 and can be divided by 2 to give 14:15.

We know the total number of balloons is 144 and that the boys received 6 balloons each.

Answer: If the boys received 6 balloons each, then they received a total of 84 balloons

Deduct $144 - 84 = 60$ total balloons left

Divide the amount by the girls ratio: $60/15 = 4$ balloons each were placed in the party bags by Ben for the girls

The best way to deal with ratio questions is to create a ratio box, which records all the important pieces of information required to reach the answer. The information in yellow was calculated e.g.

Total Items	
144 Balloons	
Amount Shared	
$(6 \times 14) = 84 : (144 - 84) = 60$	
Multiplier (x) 6 (Boys Balloons)	Multiplier (x) Girls Balloons = $(60/15) = 4$
Ratio	
28:30	
14:15	

Averages

Average or Mean = total of all items / the total number of items

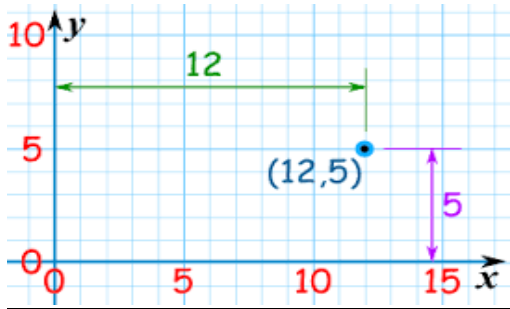
Median = The middle value after the given set of numbers have been re-arranged in ascending order

Mode = Is most common number of a given set of numbers

Range = Is the difference between the largest and smallest value of a given set of numbers

6 Co-ordinates Reading

Coordinates are the numbers used to tell us how to get to a certain point on a grid, a graph or a map. The grid, graph or map will have an x-axis, which runs horizontally, and a y-axis that runs vertically. The graph below illustrates the points (12,5) e.g. 12 along the x-axis and 5 along the y-axis



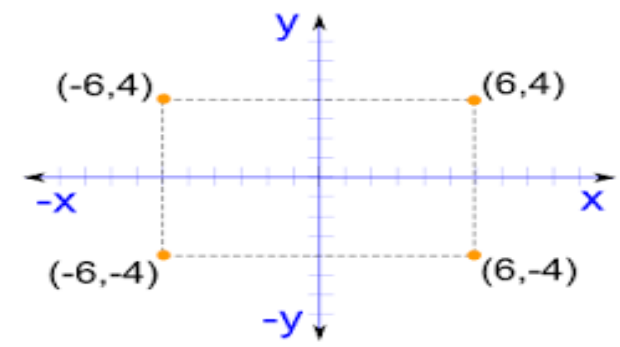
A graph may have four quadrants. The graph, which follows, illustrates both minus and positive numbers. The x-axis and y-axis intersect at 0. Movement either right or up from zero is regarded as a positive movement. Movement either left or down from zero is regarded as a minus movement. For example:

Point (6,4): 6 to the right and 4 up (right and up both positive);

Point (6,-4): 6 to the right and 4 down (right positive, down negative);

Point (-6,4): 6 to the left and 4 up (left negative, up positive); and

Point (-6,-4): 6 to the left and 4 down (left is negative, down is negative)



7 Prime Numbers

A prime number (or a prime) is a natural number greater than 1 that has no positive divisors other than 1 and itself. A natural number greater than 1 that is not a prime number is called a composite number. For example, 5 is prime because 1 and 5 are its only positive integer factors, whereas 6 is composite because it has the divisors 2 and 3 in addition to 1 and 6.

Here is a table of all prime numbers up to 1,000:

	2	3	5	7	11	13	17	19	23
29	31	37	41	43	47	53	59	61	67
71	73	79	83	89	97	101	103	107	109
113	127	131	137	139	149	151	157	163	167
173	179	181	191	193	197	199	211	223	227
229	233	239	241	251	257	263	269	271	277
281	283	293	307	311	313	317	331	337	347
349	353	359	367	373	379	383	389	397	401
409	419	421	431	433	439	443	449	457	461
463	467	479	487	491	499	503	509	521	523
541	547	557	563	569	571	577	587	593	599
601	607	613	617	619	631	641	643	647	653
659	661	673	677	683	691	701	709	719	727
733	739	743	751	757	761	769	773	787	797
809	811	821	823	827	829	839	853	857	859
863	877	881	883	887	907	911	919	929	937
941	947	953	967	971	977	983	991	997	

8 Pythagoras Theorem

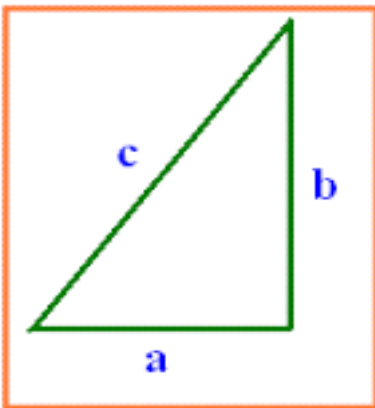
Greek philosopher; known as Pythagoras of Samos. Pythagoras sought to interpret the entire physical world in terms of numbers, and founded their systematic and mystical study; he is best known for the theorem of the right-angled triangle.

The isosceles right triangle Pythagorean triple is a name derived from the Pythagorean theorem, stating that every right triangle has side lengths satisfying the formula $a^2 + b^2 = c^2$; thus, Pythagorean triples describe the three integer side lengths of a right triangle. Let's say $a=3$ and $b=4$, calculating c is as follows

$$3^{(2)} + 4^{(2)} = c^{(2)}$$

$$9 + 16 = 25 = c^{(2)}$$

$$c = \sqrt{25} = 5$$



All triangles have 3 sides and 3 angles, which always add up to 180°

The following table displays the common Pythagorean Triples

Pythagorean Triples			
(3, 4, 5)	(5, 12, 13)	(7, 24, 25)	(8, 15, 17)
(9, 40, 41)	(11, 60, 61)	(12, 35, 37)	(13, 84, 85)
(16, 63, 65)	(20, 21, 29)	(28, 45, 53)	(33, 56, 65)
(36, 77, 85)	(39, 80, 89)	(48, 55, 73)	(65, 72, 97)

9 BIDMAS Calculations

BIDMAS (also known as BODMAS) ORDER OF FORMULA CALCULATION:

B RACKETS (first: parts of a calculation inside brackets)

I NDICES (second: Indices are numbers that are multiplied a number of times by itself)

D IVIDE (Do any dividing or multiplying in order of the question)

M ULTIPLY (Do any dividing or multiplying in order of the question)

A DDITION (Do any adding or subtracting in order of the question)

S UBTRACTION (Do any adding or subtracting in order of the question)

Example:

$$5 \times (3 \times 8 + 2) - 4^2 / 2 - 6$$

Brackets first and multiplication before addition = $24 + 2 = 26$

Indices next $16 / 2 = 8$

Equation reads $5 \times 26 - 8 - 6$ (divide or multiply in order of the question)

Now equation reads $130 - 8 - 6 = 116$

Algebra is the part of mathematics in which letters and other general symbols are used to represent numbers and quantities in formulae and equations e.g. $2x + 3y = 15$. Algebra will also follow the same rules of BIDMAS

10 Positive & Negative Multiplication Outcomes

SIGNS – MULTIPLICATION:

Positive x Positive = Positive $6 \times 6 = 36$

Positive x Negative = Negative $6 \times -6 = -36$

Negative x Positive = Negative $-6 \times 6 = -36$

Negative x Negative = Positive $-6 \times -6 = 36$

SIGNS – DIVISION:

Positive ÷ Positive = Positive $24 / 8 = 3$

Positive ÷ Negative = Negative $24 / -8 = -3$

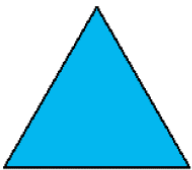
Negative ÷ Positive = Negative $-24 / 8 = -3$

Negative ÷ Negative = Positive $-24 / -8 = 3$

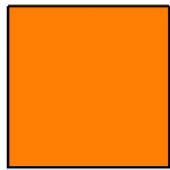
11 Polygon & Geometric Shapes 3D

A **polygon** is any 2-dimensional shape formed with straight lines. Triangles, quadrilaterals, pentagons, and hexagons are all examples of polygons. The name tells you how many sides the shape has. For example, a triangle has three sides, and a quadrilateral has four sides. Examples of regular Polygons

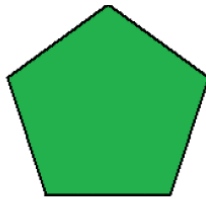
Sides	Name
3	Triangle
4	Quadrilateral
5	Pentagon
6	Hexagon
7	Heptagon
8	Octagon
9	Nonagon
10	Decagon
12	Dodecagon



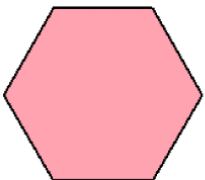
Equilateral triangle



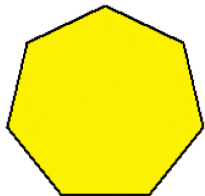
Square



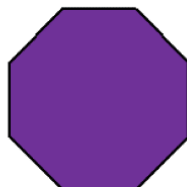
Regular Pentagon



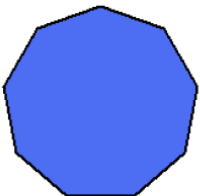
Regular Hexagon



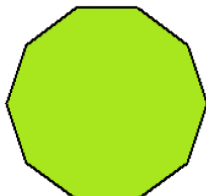
Regular Heptagon



Regular Octagon



Regular Nonagon



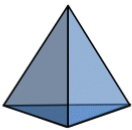


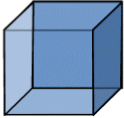
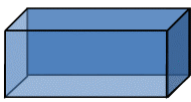
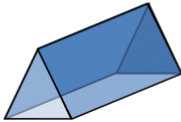

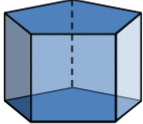
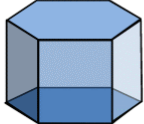
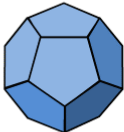
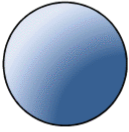
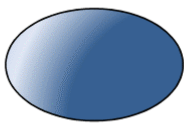


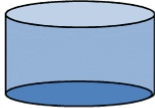
Regular Decagon



Regular Dodecagon

In mathematical terms, **Geometric Shapes 3D** has three dimensions. The D in '3D' stands for dimensional. In a world with three dimensions, you can travel forwards, backwards, right, left, and even up and down. The ability to travel up into space and back down differentiates 3D from 2D.

Faces	Name
1	Ellipsoid
2	Cone
3	Cylinder
4	Tetrahedron
5	Pyramid
6	Cube
7	Hexagonal
8	Octahedron
12	Dodecahedron
20	Icosahedron

		
Tetrahedron Faces: 4; Edges: 6; Vertices: 4	Square pyramid Faces: 5; Edges: 8; Vertices: 5	Hexagonal pyramid Faces: 7; Edges: 12; Vertices: 7
		
Cube Faces: 6; Edges: 12; Vertices: 8	Cuboid Faces: 6; Edges: 12; Vertices: 8	Triangular prism Faces: 5; Edges: 9; Vertices: 6
		
Octahedron Faces: 8; Edges: 12; Vertices: 6	Pentagonal prism Faces: 7; Edges: 15; Vertices: 10	Hexagonal prism Faces: 8; Edges: 18; Vertices: 12
		
Dodecahedron Faces: 12; Edges: 30; Vertices: 20	Sphere Faces: 1; Edges: 0; Vertices: 0	Ellipsoid Faces: 1; Edges: 0; Vertices: 0
		
Icosahedron Faces: 20; Edges: 30; Vertices: 12	Cone Faces: 2; Edges: 1; Vertices: 0 or 1	Cylinder Faces: 3; Edges: 2; Vertices: 0

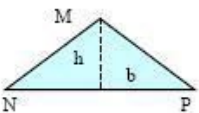
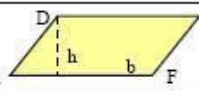
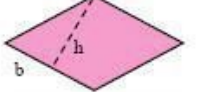
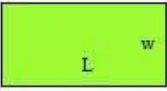

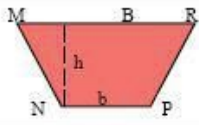
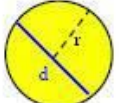
12 Area, Perimeter & Volume

An Area is defined as the size of a surface.

The Perimeter is defined as the total distance around the shape.

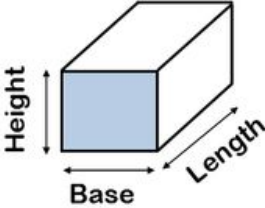
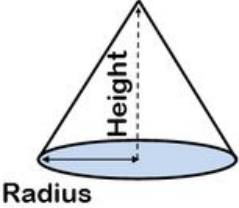
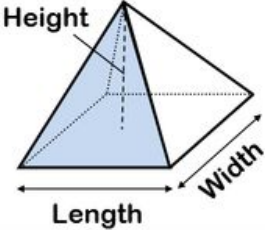

The Volume is the measure of the amount of space inside of a solid figure, like a cube, ball, cylinder or pyramid.

Formulas tabulated for calculation of common shapes for area, perimeter and volume:

NAME	FIGURE	AREA	PERIMETER CIRCUMFERENCE
TRIANGLE		$A = \frac{b \times h}{2}$	$P = MN + NP + PM$
PARALLELOGRAM		$A = b \times h$	$P = DE + EF + FG + GD$
RHOMBUS		$A = b \times h$	$P = b + b + b + b$ $P = 4b$
RECTANGLE		$A = L \times w$	$P = L + w + L + w$ $P = 2L + 2w$
SQUARE		$A = l^2$	$P = l + l + l + l$ $P = 4l$
TRAPEZOID		$A = \frac{(B + b) \times h}{2}$	$P = MN + NP + PR + RM$
CIRCLE		$A = \pi r^2$	$C = 2\pi r = \pi d$

Area for Kite

	Kite	Length x Height ÷ 2
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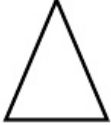
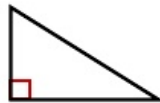
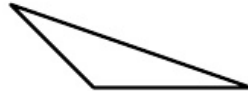
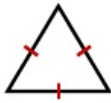
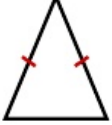
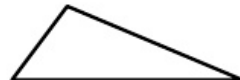
Shape	Name	Formula for Volume
	Prism	Cross-sectional area x length
	Cone	$\frac{1}{3} \times \pi r^2 \times$ height
	Pyramid	$\frac{1}{3} \times \text{length} \times$ width x height
	Sphere	$\frac{4}{3} \times \pi r^3$

13 Triangles & Angles

Basic information on triangles and angles for revision purposes:

Objective - To classify triangles.

Triangle Names

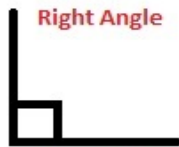
Angle Name	 <p>Acute - <u>All</u> angles less than 90°.</p>	 <p>Right - <u>Only One</u> angle equal to 90°.</p>	 <p>Obtuse- <u>Only One</u> angle more than 90°.</p>
Side Name	 <p>Equilateral- <u>All</u> three sides equal.</p>	 <p>Isosceles- <u>Two</u> sides equal.</p>	 <p>Scalene - No equal sides.</p>

Acute Angle



Less than 90°

Right Angle



Exactly 90°

Obtuse Angle



Greater than 90° but less than 180°

Straight Angle



Exactly 180°

Reflex Angle

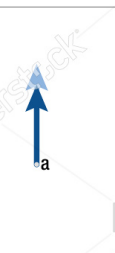


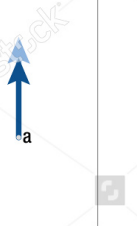
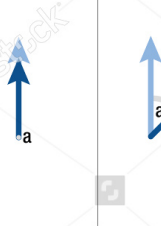
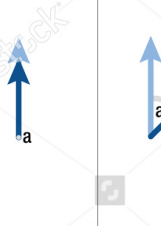
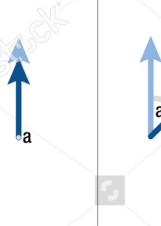


Greater than 180°

Full Rotation



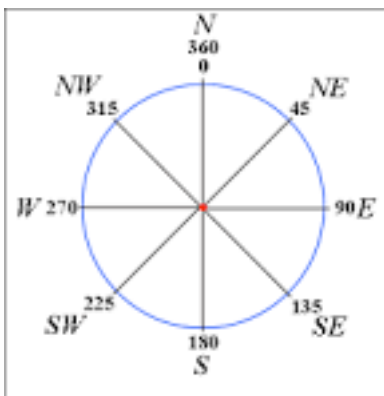
Exactly 360°

						
$a = 0^\circ$ ZERO DEGREE ANGLE	$0^\circ < a < 90^\circ$ ACUTE ANGLE	$a = 90^\circ$ RIGHT ANGLE	$90^\circ < a < 180^\circ$ OBTUSE ANGLE	$a = 180^\circ$ STRAIGHT ANGLE	$180^\circ < a < 360^\circ$ REFLEX ANGLE	$a = 360^\circ$ FULL ANGLE

Bearings

The bearing of a point is the number of degrees in the angle measured in a clockwise direction from the north line to the line joining the centre of the compass with the point. A bearing is used to represent the direction of one point relative to another point.

The 8 points of the compass should be understood in communications about bearings:



If A was the centre then the bearings would be communicated as:

A to NE is 045° NE; A to NW is 315° NW

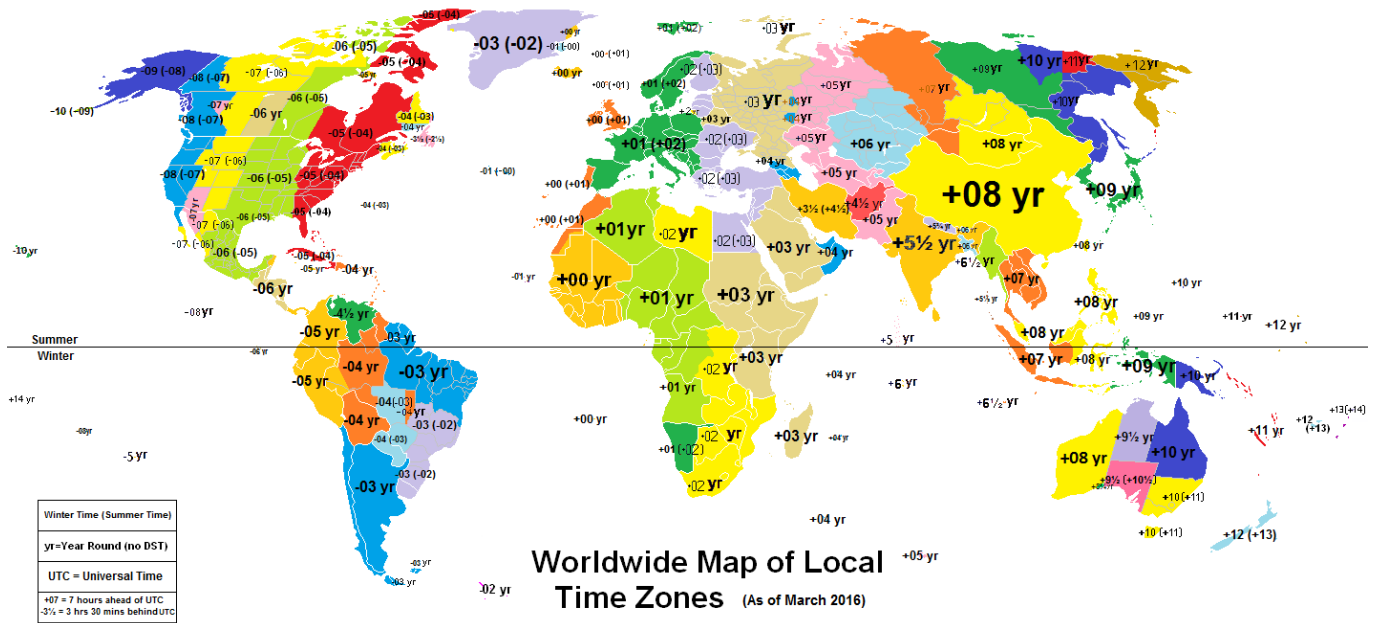
14 Number Sequences

A sequence, in mathematics follows a particular pattern. This may be objects or numbers but the pattern followed will be similar for both. The sequence terms will always follow some logical rule that will include either independently or a mixture of addition, subtraction, multiplication and division. Some patterns are provided below for your reference.

- Addition or subtraction of same number (3) to a sequence e.g. 1, 4, 7
- Ascending numbers addition or subtraction (1,2,3) e.g. 1, 3, 6
- Dual Pattern numbers (+7, -3, +8, -4,) e.g. 1, 8, 5, 13, 9
- Descending number addition or subtraction (5, 4, 3) e.g. 10, 15, 19, 18
- Addition and subtraction of odd/even number (1,3,5) e.g. 1, 2, 5, 10
- Leapfrog sequence (-5, 1, -5, 1) e.g. 30, 20, 25, 21, 20, 22 (two sequence in parallel to different rules)
- Add first term, Subtract second term or vice versa (8, -3, 8, -3) e.g. 20, 28, 25, 33, 30, 38
- Multiplication/division of sequences of above numbers, including square and cube numbers

The point to note is that there are many combinations and they cannot all be communicated. The secret is to analyse what is happening with the numbers. There is ample practice questions included in the programme from level 1 to level 3, across many combinations of addition, subtraction, multiplication, division and a combination of the four, to ensure robust practice for 11+ exams.

15 World Time Zone Map



16 Useful 11+ Mathematical Definitions

Adding	Process of totalling numbers or joining
Algebra	Part of maths, where letters and symbols used to represent numbers and quantities in formulae and equations
Angle	The amount of turn between two straight lines that have a common end point (the vertex)
Annulus	A ring formed by 2 concentric circles
Anti-clockwise	Rotating in the opposite direction to the clock
Approximation	A value or quantity that is nearly but not exactly correct e.g. estimated
Arc	A part of a curve, especially a part of the circumference of a circle
Area	Size of a surface
Average	The value found by adding all of the numbers in a set together and then dividing them by the quantity of numbers in the set
Bar Chart	Grouped data with rectangular bars with lengths proportional to the values that they represent
Bearings	A bearing is an angle, measured clockwise from the north direction
BIDMAS	An acronym about the order of operation to follow
BODMAS	Similar to BIDMAS, where O = Operation
Chord	Line across a circle with two end points
Circumference	All the way round a circle, also known as perimeter
Clockwise	Same direction as the hands of a clock
Coefficient	A constant that is associated or connected with a variable. It stands in front of the variable. The value of the variable is multiplied by the coefficient e.g. $4y$
Collinear Points	Points lying on a straight line
Complimentary Angles	Either of two angles whose sum is 90°
Concentric Angles	At least two circles with the same centre
Concentric Circles	Circles with the same point at the centre
Constant	A value that remains unchanged.

Coordinates	The location of a point on a graph, grid or map
Cube	A six sided solid with each face a square
Cube Number	A number multiplied by itself 3 times
Cube Root	A number that is cubed e.g. cube root of 27 is 3
Cuboid	A six sided solid with each face a rectangle
Cylinder	A circular prism
Decimal places	Number of digits after the decimal point
Denominator	Bottom number of a fraction
Diagonal	Straight line sloping from corner to corner of a shape
Diameter	Line across full width of the circle
Distance	The length of space between two points
Division	The process of separating something into parts
Ellipse	An oval shape
Equilateral Triangle	Triangle with equal lengths and 3 angles of 60°
Estimating	To calculate roughly but not exact e.g. approximate
Expression	A collection of quantities made up of constants and variables linked by operational signs, such as + and -. It does not include an = (equals) sign.
Face	The flat part on the outside of a solid object
Factor	A number that exactly divides into another number
Flow Diagram	A diagram of the sequence of movements
Formula	Is a mathematical rule
Fraction	A numerical quantity that is not a whole number
Geometry	Is a branch of mathematics concerned with questions of shape, size, relative position of figures, and the properties of space
Gradient	Is a way of measuring a slope
Graph	A diagram showing the relation between variable quantities
Highest Common Factor	the highest number that can be divided exactly into each of two or more numbers
Hypotenuse	Longest side of a right-angled triangle
Improper Fraction	Fraction where the top number is greater than the bottom number

Indices	Indices are numbers that are multiplied a number of times by itself
Integer	Whole number
Intersection	A point where two or more lines meet
Isosceles Triangle	Triangle with two sides of equal length and two equal angles
Loss	An amount or number lost
Lowest Common Multiple	The smallest number that is a common multiple or denominator of a given set of numbers e.g. all denominators divide into the LCM
Mean	Sum of quantities \div number of quantities (average)
Median	The middle number of a set of numbers placed in size order
Mixed Number	A whole number and a (vulgar) fraction
Mode	Most common value derived from a set of numbers
Multiplication	The process of combining matrices, vectors, or other quantities under specific rules to obtain their product
Numerator	Top number of a fraction
Oblique Lines	Slant or slope
Obtuse Angle	An angle more than 90° but less than 180°
Parallel Lines	2 lines running in same direction, but never meeting
Parallelogram	4-sided plane figure with two pairs of parallel sides
Percentage	A rate, number, or amount in each hundred (%)
Perimeter	The total distance round the outside of a shape
Perpendicular	At right angles
Pi	The number (π) 3.14159 is a mathematical constant
Pie Chart	A type of graph in which a circle is divided into sectors that each represents a proportion of the whole
Polygon	A plane figure with at least three straight sides and angles, and typically five or more
Polyhedron	a solid figure with many plane faces, 6 or more
Prime Number	A number that only has two factors: itself and 1

Prism	A solid geometric figure whose two ends are similar, equal, and parallel rectilinear figures, and whose sides are parallelograms
Probability	The extent to which something is likely to happen
Profit	The amount, which is gained in one process
Quadrant	Each of four quarters of a circle e.g. $\frac{1}{4}$ of a circle
Radius	A line halfway across from the centre to the edge
Range	Difference between smallest and the largest value
Ratio	A way of comparing 2 or more values
Reciprocal	The same fraction the other way up
Rotation	The action of rotating about an axis or centre
Rounding	The process of making something round or whole
Segment	A circle, which is "cut off" from the rest of the circle by a chord
Scale Drawing	A drawing that shows a real object with accurate sizes reduced or enlarged by a certain amount
Scalene Triangle	A triangle with no sides equal and no angles equal
Sector	Part of a circle like a piece of cake
Semi-Circle	A half circle
Sequence	A particular order in which related things follow each other
Speed	Can be measured by dividing the distance by time
Square Number	The product of a number multiplied by itself, e.g. 1, 4
Square Root	A number, which produces a specified quantity when multiplied by itself
Subtracting	Take away from another to calculate the difference
Symmetry	The quality of being made up of exactly similar parts facing each other or around an axis
Tangent	Straight line meets perimeter of circle in one place
Time Zone	An overview of current local times around the world
Transversal	A line across two parallel lines
Trapezium	A 4-sided plane figure with one pair of parallel sides
Triangle	A plane figure with 3 sides

Trigonometry	The branch of mathematics dealing with the relations of the sides and angles of triangles and with the relevant functions of any angles
VAT	Value added tax, charged on goods and services @ 20% of the purchase price
Venn Diagram	Circular pictorial mathematical diagrams
Vertical Line	A line drawn straight up or down or exactly upright
Volume	Measure of the amount of space inside of a solid figure, like a cube, ball, cylinder or pyramid
Vulgar fraction	Ordinary fraction with one number over another
X-axis	Is the horizontal axis
Y-axis	Is the vertical axis