






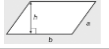

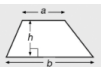


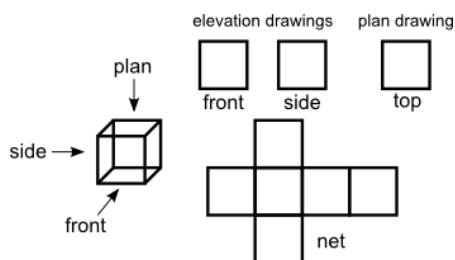
GCSE MATHS NEED TO KNOW 2019-2020 - FOUNDATION




GEOMETRY


A) Angle facts - lines		
1	Vertically opposite angles	are equal 
2	Angles on a straight line	add up to 180 
3	Angles at a point	add up to 360 
4	Alternate angles	are equal 
5	Corresponding angles	are equal 
6	Co-interior angles	add up to 180 

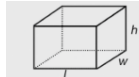
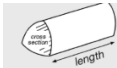


D) Congruence and similarity		
15	The four <u>congruency</u> tests are....	SSS ASA SAS RASH
16	Triangles are <u>similar</u> if...	All angles are the same (AAA) They are an enlargement of each other
17	Area scale factor	Length scale factor ²
18	Volume scale factor	Length scale factor ³

E) Area Formulas		
19	Area of a rectangle	= length x width 
20	Area of a parallelogram	= base x perpendicular height 
21	Area of a triangle	= $\frac{1}{2}$ base x perpendicular height 
22	Area of a trapezium	= $\frac{1}{2} (a + b) \times h$ 



B) Angle facts – triangles and quadrilaterals		
7	Angles in a triangle	add up to 180 
8	Two angles of an isosceles triangle	are equal, two sides are equal 
9	Angles in an equilateral triangle	are equal (all 60), all sides are equal
10	Angles in a quadrilateral	add up to 360 

C) Angle facts - polygons		
11	Exterior angles of a polygon	add up to 360°
12	The interior and exterior angle of any polygon	add up to 180°
13	The sum of the interior angles of a polygon can be found by using the formula	(number of sides-2) x 180°
14	<u>Regular</u> polygons have all sides the same length and all angles the same size	

F) Volumes		
23	Volume of a cuboid	= l x w x h 
24	Volume of a prism	= area of cross section x l 
25	Volume of a cylinder	= $\pi r^2 \times h$ 
26	Pyramid	= $\frac{1}{3} \times \text{area of base} \times h$ 

G) Surface area		
26	Surface area of a prism	The sum of the area of all the 2D faces
27	Surface area of a cylinder	$2 \times \pi r^2 + \pi d \times h$

*"Half the sum of the parallel sides, times the distance between them
That is how you calculate
The area of a trapezium"*

H) Circles		
28	Circumference = $\pi \times d$	
29	Area = πr^2	
30	Area of a sector	$\frac{\theta}{360} \times \pi r^2$
31	Arc length	$\frac{\theta}{360} \times \pi d$

I) Pythagoras and Trigonometry		
32	Pythagoras' Theorem For a right angled triangle is.....	$a^2 + b^2 = c^2$ c is always the hypotenuse!
33	The trigonometric ratios are	 $\sin\theta = \frac{opp}{hyp}$ $\cos\theta = \frac{adj}{hyp}$ $\tan\theta = \frac{opp}{adj}$ SOHCAHTOA

K) Describing Transformations		
35	Rotation	<ul style="list-style-type: none"> Direction (clockwise or anticlockwise) Degrees Centre of rotation
36	Reflection	<ul style="list-style-type: none"> Line of reflection
37	Translation	<ul style="list-style-type: none"> Vector $\begin{pmatrix} x \\ y \end{pmatrix}$ where x is the horizontal movement and y is the vertical
38	Enlargement	<ul style="list-style-type: none"> Scale factor Centre of enlargement

J) Exact values				
34		30°	45°	60°
	sin	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$
	cos	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$
	tan	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$

*Circumference is pi times diameter, pi times diameter, pi times diameter
 Circumference is pi times diameter, pi times diameter, pi times diameter
 Area is pi r squared*

NUMBER

L) FDP		
39	To find a % of an amount...	Find 10% (by dividing by 10) Find 1% (by dividing by 100)
40	100%	1
41	50%	0.5 or $\frac{1}{2}$
42	25%	0.25 or $\frac{1}{4}$
43	12.5%	0.125 or $\frac{1}{8}$
44	10%	0.1 or $\frac{1}{10}$
45	% increase	Find the % and add it on
	% decrease	Find the % and take it away
46	% change (% profit or loss)	$\frac{change}{original} \times 100$
47	Compound interest	original x % multiplier number of years
48	Convert a fraction to a decimal	Make the denominator 10 or 100 OR Divide the numerator by the denominator
49	Convert a decimal to a %	X 100

"Factors come in two by two, hurrah, hurrah"




"Multiples are in the times tables..."

M) Indices		
50	$a^b \times a^c$ When <u>multiplying</u> terms with the same base....	a^{b+c} Add the powers
51	$\frac{a^b}{a^c}$ When <u>dividing</u> terms with the same base....	a^{b-c} Subtract the powers
52	$(a^b)^c$	a^{bc}
53	a^0	1



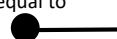

N) Standard form		
54	0.0004	4×10^{-4} (the number must be between 1 and 10)
55	40000	4×10^4 (the number must be between 1 and 10)

O) Special Numbers		
56	A factor is	A number that divides into another number without a remainder, factors always come in pairs
57	A multiple is	A number in a given numbers times table
58	A square number	Is a number multiplied by itself: 1, 4, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225
59	A prime number	Has only two factors, one and itself: 2, 3, 5, 7, 11, 13, 17.....

P) Conversions		
60	1 cm	10mm
61	1m	100cm
62	1km	1000m
63	cm \rightarrow m	$\div 100$
64	m \rightarrow cm	$\times 100$
65	cm ² \rightarrow m ²	$\div 100^2$
66	cm ³ \rightarrow m ³	$\div 100^3$
67	1kg	1000g
68	1l	1000ml




T) Compound measures		
79	Speed	$speed = \frac{distance}{time}$ 
80	Density	$density = \frac{mass}{volume}$ 
81	Pressure	$pressure = \frac{force}{area}$ 

ALGEBRA

Q) Equations		
69	Like terms have what...	Same letter, same index
R) Inequalities		
70	\leq	Less than or equal to 
71	$<$	Less than 
72	\geq	Greater than or equal to 
73	$>$	Greater than 

S) Graphs		
74	$y = mx + c$	$m = \text{gradient}$ $\frac{\text{Difference in } y}{\text{Difference in } x} = \frac{y_2 - y_1}{x_2 - x_1}$ $c = y \text{ intercept (where the line crosses } y \text{ axis)}$
75	To find the mid-point	$(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2})$
76	Parallel lines	Have the same gradient
77	Perpendicular lines	Gradient = $-\frac{1}{\text{gradient}}$
78	Roots or solutions are	The points at which the graph passes through the x-axis

DATA, RATIO AND PROPORTION

U) Correlation		
82	Positive correlation means...	As one variable <u>increases</u> the other variable <u>increases</u> , this looks like: 
83	Negative correlation means....	As one variable <u>increases</u> the other variable <u>decreases</u> , this looks like: 
84	No correlation means....	There is <u>no relationship</u> between the two variables, this looks like: 
85	Line of best fit	A straight line drawn with a ruler that goes through the data with roughly the same number of points on each side of the line
86	Interpolation	Estimating a value within a given data set
87	Extrapolation	Estimating a value outside the given data set by assuming a trend

V) Averages		
88	Mean	Add all the numbers and divide by how many there are
89	Median	Order the numbers from smallest to biggest and find the middle number
90	Mode	Most frequent
91	Range	Difference between the highest and lowest value
92	Mean from a frequency table	$\frac{\text{Total } Fx}{\text{Total } F}$
93	Mean from a grouped frequency table	<ol style="list-style-type: none"> Find the mid point of each group $\frac{\text{Total } Fx}{\text{Total } F}$

Mean is average, mean is average
 Mode is most, mode is most
 Median's in the middle, median's in the middle
 Range high take low, high take low

W) Probability		
94	Probabilities of mutually exclusive events	Add up to 1
95	$P(A \cap B)$	Probability of A AND B
97	$P(A \cup B)$	Probability of A OR B