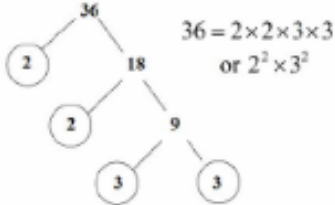




Topic/Skill	Definition/Tips	Example
1. Integer	A whole number that can be positive, negative or zero.	-3, 0, 92
2. Decimal	A number with a decimal point in it. Can be positive or negative.	3.7, 0.94, -24.07
3. Negative Number	A number that is less than zero . Can be decimals.	-8, -2.5
4. Addition	To find the total , or sum , of two or more numbers. 'add', 'plus', 'sum'	$3 + 2 + 7 = 12$
5. Subtraction	To find the difference between two numbers. To find out how many are left when some are taken away. 'minus', 'take away', 'subtract'	$10 - 3 = 7$
6. Multiplication	Can be thought of as repeated addition . 'multiply', 'times', 'product'	$3 \times 6 = 6 + 6 + 6 = 18$
7. Division	Splitting into equal parts or groups. The process of calculating the number of times one number is contained within another one . 'divide', 'share'	$20 \div 4 = 5$ $\frac{20}{4} = 5$
8. Remainder	The amount ' left over ' after dividing one integer by another.	The remainder of $20 \div 6$ is 2, because 6 divides into 20 exactly 3 times, with 2 left over.
9. Multiple	The result of multiplying a number by an integer. The times tables of a number.	The first five multiples of 7 are: 7, 14, 21, 28, 35
10. Factor	A number that divides exactly into another number without a remainder. It is useful to write factors in pairs	The factors of 18 are: 1, 2, 3, 6, 9, 18 The factor pairs of 18 are: 1, 18 2, 9 3, 6
11. Prime Number	A number with exactly two factors . A number that can only be divided by itself and one. The number 1 is not prime , as it only has one factor, not two.	The first ten prime numbers are: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29
12. Prime Factor	A factor which is a prime number.	The prime factors of 18 are: 2, 3



<p>13. Product of Prime Factors</p>	<p>Finding out which prime numbers multiply together to make the original number.</p> <p>Use a prime factor tree.</p> <p>Also known as 'prime factorisation'.</p>	
<p>14. Square Number</p>	<p>The number you get when you multiply a number by itself.</p>	<p>1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225...</p> <p>$9^2 = 9 \times 9 = 81$</p>
<p>15. Square Root</p>	<p>The number you multiply by itself to get another number.</p> <p>The reverse process of squaring a number.</p>	<p>$\sqrt{36} = 6$</p> <p>because $6 \times 6 = 36$</p>
<p>16. Solutions to $x^2 = \dots$</p>	<p>Equations involving squares have two solutions, one positive and one negative.</p>	<p>Solve $x^2 = 25$</p> <p>$x = 5$ or $x = -5$</p> <p>This can also be written as $x = \pm 5$</p>
<p>17. Cube Number</p>	<p>The number you get when you multiply a number by itself and itself again.</p>	<p>1, 8, 27, 64, 125...</p> <p>$2^3 = 2 \times 2 \times 2 = 8$</p>
<p>18. Cube Root</p>	<p>The number you multiply by itself and itself again to get another number.</p> <p>The reverse process of cubing a number.</p>	<p>$\sqrt[3]{125} = 5$</p> <p>because $5 \times 5 \times 5 = 125$</p>
<p>19. Powers of...</p>	<p>The powers of a number are that number raised to various powers.</p>	<p>The powers of 3 are:</p> <p>$3^1 = 3$ $3^2 = 9$ $3^3 = 27$ $3^4 = 81$ etc.</p>

Try these ...

- Work out
 - $14.7 + 2.63 - 1.5$
 - 37.3×20
 - Find the cost of 3 shirts costing £8.99 each.
- The temperature in a freezer should be -12°C .
 - During a power cut, the temperature in Bill's freezer went up by 15°C . What was the new temperature?
 - The temperature in Ahad's new freezer is 20°C . When he switched on the freezer, the temperature fell by 2°C per hour.
How many hours did it take for the freezer to reach the correct temperature?
- Between which two whole numbers does $\sqrt{57}$ lie?
 - Between which two whole numbers does $\sqrt[3]{100}$ lie?
- Bill changes his torch battery every 55 days. Asfa changes her supertorch battery every 30 days. One morning they both put new batteries in their torches. Use prime factors to find when they would next both change their batteries together, assuming they used their torches at the same rate.
- Work out the difference between 6^3 and 14^2



Topic/Skill	Definition/Tips	Example
1. Area	The amount of space inside a shape. Units include: mm^2 , cm^2 , m^2	
2. Area of a Rectangle	Length x Width	
3. Area of a Parallelogram	Base x Perpendicular Height Not the slant height.	
4. Area of a Triangle	Base x Height ÷ 2	
5. Area of a Kite	Split in to two triangles and use the method above.	
6. Area of a Trapezium	$\frac{(a + b)}{2} \times h$ "Half the sum of the parallel side, times the height between them. That is how you calculate the area of a trapezium"	
7. Compound Shape	A shape made up of a combination of other known shapes put together.	
8. Volume	Volume is a measure of the amount of space inside a solid shape. Units: mm^3 , cm^3 , m^3 etc.	
9. Volume of a Cube/Cuboid	$V = \text{Length} \times \text{Width} \times \text{Height}$ $V = L \times W \times H$ You can also use the Volume of a Prism formula for a cube/cuboid.	

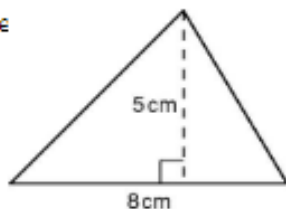


10. Prism	A prism is a 3D shape whose cross section is the same throughout.	
11. Cross Section	The cross section is the shape that continues all the way through the prism.	
12. Volume of a Prism	$V = \text{Area of Cross Section} \times \text{Length}$ $V = A \times L$	

Try these

1 Find the area of

a) the triangle



b) the parallelogram



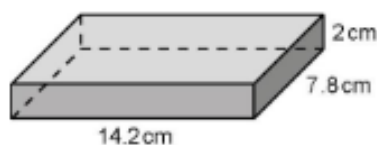
2 The measurements of this polygon are given in cm.

a) Write the name of the shape.

b) Work out its area using the formula for this shape.



3 The measurements of this cuboid are given in cm.



Find the volume of this shape. Make sure to include the units in your answer.

4 Complete the missing measurements.

a) 3 m =

..... cm

b) 8500 ml =

..... litres

c) 4 tonnes =

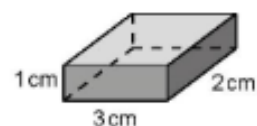
..... kg

d) 2.4 litres =

..... cm³

5 The volume of a cube is 64 cm³. Find the length of its edge.

6 Find the surface area of the cuboid





Topic/Skill	Definition/Tips	Example																																																
1. Types of Bar Chart	<p>Compound/Composite Bar Charts show data stacked on top of each other.</p> <p>Comparative/Dual Bar Charts show data side by side.</p>																																																	
2. Pie Chart	<p>Used for showing how data breaks down into its constituent parts.</p> <p>When drawing a pie chart, divide 360° by the total frequency. This will tell you how many degrees to use for the frequency of each category.</p> <p>Remember to label the category that each sector in the pie chart represents.</p>	<p>If there are 40 people in a survey, then each person will be worth $360 \div 40 = 9^\circ$ of the pie chart.</p>																																																
3. Two Way Tables	<p>A table that organises data around two categories.</p> <p>Fill out the information step by step using the information given.</p> <p>Make sure all the totals add up for all columns and rows.</p>	<p>Question: Complete the 2 way table below.</p> <table border="1"> <thead> <tr> <th></th> <th>Left Handed</th> <th>Right Handed</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Boys</td> <td>10</td> <td></td> <td>58</td> </tr> <tr> <td>Girls</td> <td></td> <td></td> <td>42</td> </tr> <tr> <td>Total</td> <td></td> <td>84</td> <td>100</td> </tr> </tbody> </table> <p>Answer: Step 1, fill out the easy parts (the totals)</p> <table border="1"> <thead> <tr> <th></th> <th>Left Handed</th> <th>Right Handed</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Boys</td> <td>10</td> <td>48</td> <td>58</td> </tr> <tr> <td>Girls</td> <td></td> <td></td> <td>42</td> </tr> <tr> <td>Total</td> <td>10</td> <td>84</td> <td>100</td> </tr> </tbody> </table> <p>Answer: Step 2, fill out the remaining parts</p> <table border="1"> <thead> <tr> <th></th> <th>Left Handed</th> <th>Right Handed</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Boys</td> <td>10</td> <td>48</td> <td>58</td> </tr> <tr> <td>Girls</td> <td>6</td> <td>36</td> <td>42</td> </tr> <tr> <td>Total</td> <td>16</td> <td>84</td> <td>100</td> </tr> </tbody> </table>		Left Handed	Right Handed	Total	Boys	10		58	Girls			42	Total		84	100		Left Handed	Right Handed	Total	Boys	10	48	58	Girls			42	Total	10	84	100		Left Handed	Right Handed	Total	Boys	10	48	58	Girls	6	36	42	Total	16	84	100
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4. Correlation	Correlation between two sets of data means they are connected in some way.	There is correlation between temperature and the number of ice creams sold.																																																
5. Positive Correlation	As one value increases the other value increases .																																																	
6. Negative Correlation	As one value increases the other value decreases .																																																	
7. Scatter Graph	A graph in which values of two variables are plotted along two axes to compare them and see if there is any connection between them.																																																	



8. Line of Best Fit	A straight line that best represents the data on a scatter graph.																					
9. Outlier	A value that 'lies outside' most of the other values in a set of data. An outlier is much smaller or much larger than the other values in a set of data.																					
10. Types of Data	Qualitative Data – non-numerical data Quantitative Data – numerical data	Qualitative Data – eye colour, gender																				
11. Grouped Data	Data that has been bundled in to categories . Seen in grouped frequency tables, histograms, cumulative frequency etc.	<table border="1"> <thead> <tr> <th>Foot length, l, (cm)</th> <th>Number of children</th> </tr> </thead> <tbody> <tr> <td>$10 \leq l < 12$</td> <td>5</td> </tr> <tr> <td>$12 \leq l < 17$</td> <td>53</td> </tr> </tbody> </table>	Foot length, l , (cm)	Number of children	$10 \leq l < 12$	5	$12 \leq l < 17$	53														
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12. Mean	Add up the values and divide by how many values there are.	<p>The mean of 3, 4, 7, 6, 0, 4, 6 is</p> $\frac{3 + 4 + 7 + 6 + 0 + 4 + 6}{7} = 5$																				
13. Mean from a Table	<ol style="list-style-type: none"> Find the midpoints (if necessary) Multiply Frequency by values or midpoints Add up these values Divide this total by the Total Frequency <p>If grouped data is used, the answer will be an estimate.</p>	<table border="1"> <thead> <tr> <th>Height in cm</th> <th>Frequency</th> <th>Midpoint</th> <th>F × M</th> </tr> </thead> <tbody> <tr> <td>$0 < h \leq 10$</td> <td>8</td> <td>5</td> <td>$8 \times 5 = 40$</td> </tr> <tr> <td>$10 < h \leq 30$</td> <td>10</td> <td>20</td> <td>$10 \times 20 = 200$</td> </tr> <tr> <td>$30 < h \leq 40$</td> <td>6</td> <td>35</td> <td>$6 \times 35 = 210$</td> </tr> <tr> <td>Total</td> <td>24</td> <td>Ignore!</td> <td>450</td> </tr> </tbody> </table> <p>Estimated Mean height: $450 \div 24 = 18.75\text{cm}$</p>	Height in cm	Frequency	Midpoint	F × M	$0 < h \leq 10$	8	5	$8 \times 5 = 40$	$10 < h \leq 30$	10	20	$10 \times 20 = 200$	$30 < h \leq 40$	6	35	$6 \times 35 = 210$	Total	24	Ignore!	450
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Try these ...

1. The table shows the results of a 7-a-side football tournament.

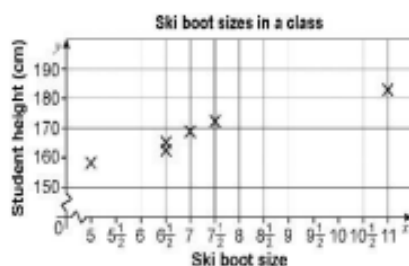
Number of goals scored	0	1	2	3	7
Number of teams	6	4	4	3	1

a) Calculate the mean number of goals scored.

2. This two-way table shows the results of a survey about the amount of pocket money some children received per week. Complete the table

	$0 < \pounds \leq 1$	$1 < \pounds \leq 5$	$5 < \pounds \leq 10$	Total
Boys		25		48
Girls	11	15		
Total	30		10	

b) What type of correlation does the scatter graph show?





Topic/Skill	Definition/Tips	Example
1. Square Number	The number you get when you multiply a number by itself .	1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225... $9^2 = 9 \times 9 = 81$
2. Square Root	The number you multiply by itself to get another number. The reverse process of squaring a number.	$\sqrt{36} = 6$ because $6 \times 6 = 36$
3. Solutions to $x^2 = \dots$	Equations involving squares have two solutions , one positive and one negative .	Solve $x^2 = 25$ $x = 5$ or $x = -5$ This can also be written as $x = \pm 5$
4. Cube Number	The number you get when you multiply a number by itself and itself again .	1, 8, 27, 64, 125... $2^3 = 2 \times 2 \times 2 = 8$
5. Cube Root	The number you multiply by itself and itself again to get another number. The reverse process of cubing a number.	$\sqrt[3]{125} = 5$ because $5 \times 5 \times 5 = 125$
6. Powers of...	The powers of a number are that number raised to various powers .	The powers of 3 are: $3^1 = 3$ $3^2 = 9$ $3^3 = 27$ $3^4 = 81$ etc.
7. Multiplication Index Law	When multiplying with the same base (number or letter), add the powers . $a^m \times a^n = a^{m+n}$	$7^5 \times 7^3 = 7^8$ $a^{12} \times a = a^{13}$ $4x^5 \times 2x^8 = 8x^{13}$
8. Division Index Law	When dividing with the same base (number or letter), subtract the powers . $a^m \div a^n = a^{m-n}$	$15^7 \div 15^4 = 15^3$ $x^9 \div x^2 = x^7$ $20a^{11} \div 5a^3 = 4a^8$
9. Brackets Index Laws	When raising a power to another power, multiply the powers together. $(a^m)^n = a^{mn}$	$(y^2)^5 = y^{10}$ $(6^3)^4 = 6^{12}$ $(5x^6)^3 = 125x^{18}$
10. Notable Powers	$p = p^1$ $p^0 = 1$	$99999^0 = 1$
1. Solve	To find the answer/value of something Use inverse operations on both sides of the equation (balancing method) until you find the value for the letter.	Solve $2x - 3 = 7$ Add 3 on both sides $2x = 10$ Divide by 2 on both sides $x = 5$
2. Inverse	Opposite	The inverse of addition is subtraction. The inverse of multiplication is division.



Try these ...

1 a) i Write $2 \times 2 \times 2 \times 2 \times 2$ as a power of 2

ii Work out the answer to part a i.

b) i Write n to the power of 3 in index form.

ii Write this as a product .

2 Solve these equations.

a) $q + 4 = 11$

b) $\frac{s}{4} = 3$

3 Solve these equations.

a) $7v - 2 = 19$

b) $\frac{3w}{4} = 24$

4 Write and solve an equation to find the size of angle x .

