



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	$p = p^1$ $p^0 = 1$	$99999^0 = 1$
11. Negative Powers	A negative power performs the reciprocal. $a^{-m} = \frac{1}{a^m}$	$3^{-2} = \frac{1}{3^2} = \frac{1}{9}$



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1. Standard Form	$A \times 10^b$ <p>where $1 \leq A < 10$, $b = \text{integer}$</p>	$8400 = 8.4 \times 10^3$ $0.00036 = 3.6 \times 10^{-4}$
2. Multiplying or Dividing with Standard Form	<p>Multiply: Multiply the numbers and add the powers.</p> <p>Divide: Divide the numbers and subtract the powers.</p>	$(1.2 \times 10^3) \times (4 \times 10^6) = 8.8 \times 10^9$ $(4.5 \times 10^5) \div (3 \times 10^2) = 1.5 \times 10^3$
3. Adding or Subtracting with Standard Form	Convert in to ordinary numbers, calculate and then convert back in to standard form	$2.7 \times 10^4 + 4.6 \times 10^3$ $= 27000 + 4600 = 31600$ $= 3.16 \times 10^4$


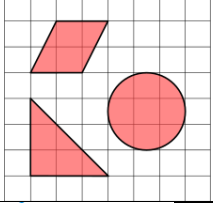

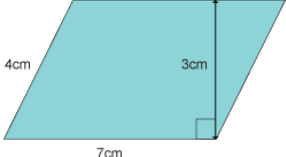
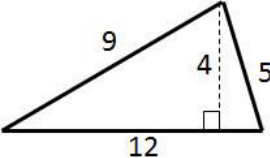
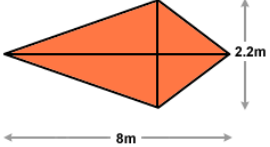
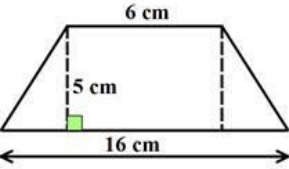
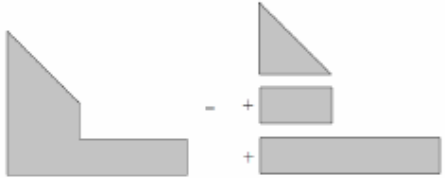


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1. Expression	A mathematical statement written using symbols, numbers or letters,	$3x + 2$ or $5y^2$
2. Equation	A statement showing that two expressions are equal	$2y - 17 = 15$
3. Identity	An equation that is true for all values of the variables An identity uses the symbol: \equiv	$2x \equiv x+x$
4. Formula	Shows the relationship between two or more variables	Area of a rectangle = length x width or $A = L \times W$
5. Simplifying Expressions	Collect 'like terms'. Be careful with negatives. x^2 and x are not like terms.	$2x + 3y + 4x - 5y + 3$ $= 6x - 2y + 3$ $3x + 4 - x^2 + 2x - 1 = 5x - x^2 + 3$
6. x times x	The answer is x^2 not $2x$.	Squaring is multiplying by itself, not by 2.
7. $p \times p \times p$	The answer is p^3 not $3p$	If $p=2$, then $p^3=2 \times 2 \times 2=8$, not $2 \times 3=6$
8. $p + p + p$	The answer is $3p$ not p^3	If $p=2$, then $2+2+2=6$, not $2^3 = 8$
9. Expand	To expand a bracket, multiply each term in the bracket by the expression outside the bracket.	$3(m + 7) = 3m + 21$
10. Factorise	The reverse of expanding. Factorising is writing an expression as a product of terms by ' taking out ' a common factor.	$6x - 15 = 3(2x - 5)$, where 3 is the common factor.

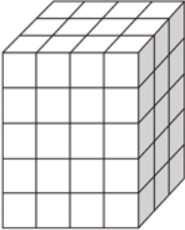
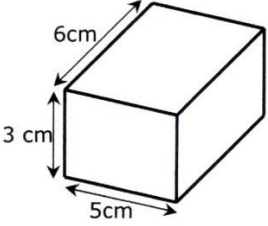
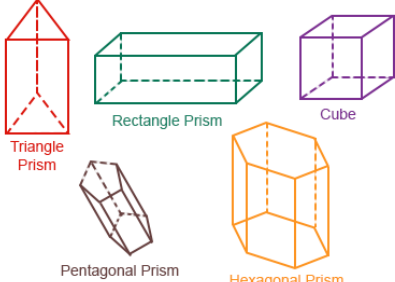
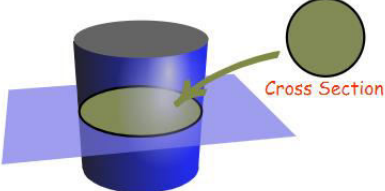


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1. Writing Formulae	<p>Substitute letters for words in the question.</p>	<p>Bob charges £3 per window and a £5 call out charge.</p> $C = 3N + 5$ <p>Where N=number of windows and C=cost</p>
2. Substitution	<p>Replace letters with numbers.</p> <p>Be careful of $5x^2$. You need to square first, then multiply by 5.</p>	<p>$a = 3, b = 2$ and $c = 5$. Find:</p> <ol style="list-style-type: none"> 1. $2a = 2 \times 3 = 6$ 2. $3a - 2b = 3 \times 3 - 2 \times 2 = 5$ 3. $7b^2 - 5 = 7 \times 2^2 - 5 = 23$



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1. Perimeter	The total distance around the outside of a shape. Units include: <i>mm, cm, m</i> etc.	<p style="text-align: center;">8 cm</p>  <p style="text-align: center;">5 cm</p> <p style="text-align: center;">$P = 8 + 5 + 8 + 5 = 26cm$</p>
2. Area	The amount of space inside a shape. Units include: mm^2, cm^2, m^2	
3. Area of a Rectangle	Length x Width	 <p style="text-align: right;">$A = 36cm^2$</p>
4. Area of a Parallelogram	Base x Perpendicular Height Not the slant height.	 <p style="text-align: right;">$A = 21cm^2$</p>
5. Area of a Triangle	Base x Height ÷ 2	 <p style="text-align: right;">$A = 24cm^2$</p>
6. Area of a Kite	Split in to two triangles and use the method above.	 <p style="text-align: right;">$A = 8.8m^2$</p>
7. Area of a Trapezium	$\frac{(a + b)}{2} \times h$ <p>“Half the sum of the parallel side, times the height between them. That is how you calculate the area of a trapezium”</p>	 <p style="text-align: right;">$A = 55cm^2$</p>
8. Compound Shape	A shape made up of a combination of other known shapes put together.	



Topic/Skill	Definition/Tips	Example
1. Volume	Volume is a measure of the amount of space inside a solid shape. Units: mm^3, cm^3, m^3 etc.	
2. 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.	 <p style="text-align: center;"> $\text{volume} = 6 \times 5 \times 3$ $= 90 \text{ cm}^3$ </p>
3. Prism	A prism is a 3D shape whose cross section is the same throughout.	
4. Cross Section	The cross section is the shape that continues all the way through the prism.	
5. Volume of a Prism	$V = \text{Area of Cross Section} \times \text{Length}$ $V = A \times L$	