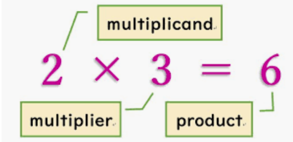
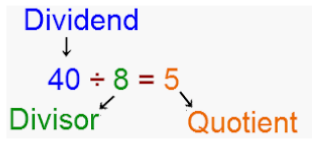
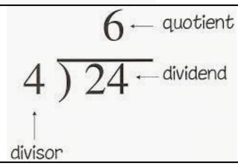
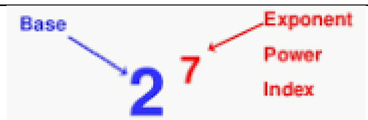
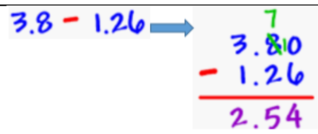
Year 9 Mathematics
Higher
HT 1

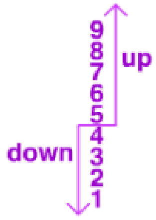
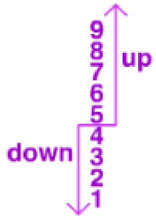
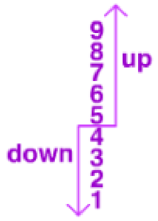
Definitions

Integer	A whole numbers and the negative equivalents.	
Positive	Greater than zero.	
Negative	Less than zero.	
Decimal	A number with digits after the decimal point.	
Operations	Symbols describing how to combine numbers. $\times \rightarrow$ Multiply, $\div \rightarrow$ Divide, $+ \rightarrow$ Add, $- \rightarrow$ Subtract,	
Multiplications terms	*Multiplicand:* The number being multiplied. *Multiplier*: The number that we are multiplying by. *Product*: The result of the multiplication operation.	
Division terms	*Dividend*: The number being divided. *Divisor:* The number we are dividing by. *Quotient:* The result of the division operation.	
Inverse operations	The operation used to reverse the original operation.	$+$ and $-$ are inverses $\times$ and $\div$ are inverses Square and square root are inverses Cube and cube root are inverses
Order of Operations	The order in which operations should be done.	B – Brackets I – Indices DM – Division & Multiplication AS – Addition & Subtraction
$\neq$	Not equal to.	
Inclusive	Includes the first and last numbers given.	
Index Form	A number written as a base to the power of something.	
Prefix	The first part of a word, sometimes separated from the rest of the word by a hyphen.	
Standard Form	A number written in the form: $A \times 10^n$, where A is between 1 and 10.	
Scientific Notation	Another name for Standard Form.	
Surd	An method of writing non square or cube numbers as exact numbers in root form .	e.g. $\sqrt{4}$ is NOT a surd because $\sqrt{4} = 2$ $\sqrt{7}$ IS a surd because it is between 2 and 3
Fraction	Represents a proportion or part of a whole.	e.g. $\frac{4}{5}$
Numerator	The number or term on top of the fraction.	$\frac{Numerator}{Denominator}$
Denominator	The number or term on the bottom of the fraction.	
Rationalise the denominator	Eliminate a surd denominator in a fraction.	

1a. Calculations, checking and rounding (N2, N3, N5, N14, N15)

i)	Add & subtract decimals	Use the column method making sure making sure the decimal points are vertically aligned	

ii)	Multiply decimals	Multiply the integers and correct place value	Calculate: $\mathbf{4.32 \times 20.8}$ Use: $432 \times 208 = 89856$ So: $4.32 \times 20.8 = 89.856$ *2 dp* *1 dp* *3dp*
iii)	Divide decimals	*Dividing a decimal by an integer*: Use short division ensuring that a decimal point is placed vertically above the decimal point in the dividend.	$\begin{array}{r} 3.7 \\ 4\overline{)14.8} \end{array}$
		Division with a decimal remainder: add a decimal point and additional zero's after the dividend to allow you to continue the short division as above.	Calculate: $\mathbf{57 \div 8}$ Use: $\begin{array}{r} 0\,7.1\,2\,5 \\ 8\overline{)5\,7.{}^{1}0{}^{2}0{}^{4}0} \end{array}$
		Dividing by a decimal: Multiply dividend and divisor by 10, 100 , 1000 so that the divisor becomes an integer then complete short division as above. N.B. Do not place value after the calculation!	Calculate: $\mathbf{6.488 \div 0.8}$ $\times 10 \quad \times 10$ Use: $64.88 \div 8 = 8.11$ So: $6.488 \div 0.8 = \mathbf{8.11}$
iv)	Multiply any number between 0 and 1	Use the methods described above in: ii) Multiply decimals *N.B.* Value of the product will be smaller than the value of the multiplicand if the multiplier is between 0 and 1 and vice-versa.	$\mathbf{12} \times 0.2 = \mathbf{6}$ And: $0.2 \times \mathbf{12} = \mathbf{6}$
	Divide any number between 0 and 1	Use the methods described above in: iii) Divide decimals *N.B.* Value of the quotient will be greater than the value of the dividend if the divisor is between 0 and 1.	$\mathbf{12} \div 0.2 = \mathbf{60}$
v)	Use one calculation to find the answer to another	Given: $a \times b = c$ Then: $c \div b = a$ and $c \div a = b$ Adjust place value if necessary.	If: $\mathbf{19 \times 24 = 456}$ $456 \div 24 = 19$ $456 \div 19 = 24$ $1.9 \times 24 = 45.6$ $456 \div 190 = 2.4$ $19 \times 240 = 4560$
vi)	Use the product rule for counting: multiple groups	There are $\boldsymbol{n}$ different options available from group A and $\boldsymbol{m}$ different options available from group B. The number of possible combinations that can occur when choosing one option from Group A and one option from Group B is given by: $\boldsymbol{n \times m}$	e.g. A restaurant serves 4 different starter and 5 different main courses. How many combinations of start and main course could you choose? $\mathbf{4 \times 5 = 30}$
	Use the product rule for counting: one group with repeats	There are $\boldsymbol{n}$ possible options available from a single group and the same option can be selected multiple times. The number of possible combinations that can occur when choosing $\boldsymbol{m}$ options is given by: n^m	e.g. A combination lock has 3 wheels with the numbers 1 to 8 on each wheel. How many different combinations are possible? $\mathbf{8^3 = 512}$
	Use the product rule for counting: one group without repeats	There are n possible options from a single group and each options can be selected once only. The number of possible outcomes that can occur when choosing m options is given by: $n \times (n-1) \times (n-2) \times \ldots \ldots . . \times (n-m+1)$	e.g. 12 people run a marathon, how many combinations of gold, silver and bronze medal winners are there? $\mathbf{12 \times 11 \times 10 = 1320}$

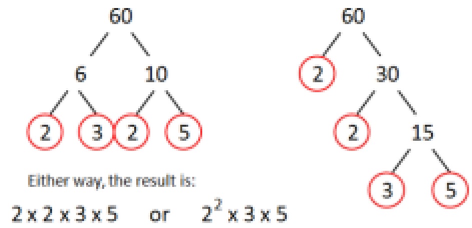
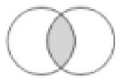
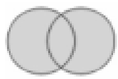
vii)	Round to a given number of decimal places	• Count the number of decimal places you need. • Look at the number to the right of that digit to decide if it rounds up or down. • 5 or more it rounds up, 4 or less it rounds down.		e.g. 36.3486343 $36.3\|486343$ To 1 d.p. is 36.3 $36.34\|86343$ To 2 d.p. is 36.35 $36.348\|6343$ To 3 d.p. is 36.349
ii)	Round a large number to a given number of significant figures	• Count the number of digits you need from the left. • Look at the number to the right of that digit to decide if it rounds up or down. • 5 or more it rounds up, 4 or less it rounds down. • Replace remaining digits with zeros as place holders.		e.g. $324\,627\,938$ $3\|24627938$ To 1 s.f. is 300000000 $32\|4627938$ To 2 s.f. is 320000000 $324\|627938$ To 3 s.f. is 325000000
ix)	Round a small number to a given number of significant figures	• Zeros are not significant until after the first non-zero number. • Find the first non-zero and count the number of digits you need from there. • Look at the number to the right of that digit to decide if it should round up or down. • 5 or more it rounds up, 4 or less it rounds down.		e.g. 0.0034792 $0.003\|4792$ To 1 s.f. is 0.003 $0.0034\|792$ To 2 s.f. is 0.0035 $0.00347\|92$ To 3 s.f. is 0.00348
x)	Estimating	• Round each number to 1 significant figure before doing any calculations. • It is acceptable to round one or more numbers in the calculation to a greater accuracy than 1 sig. fig. if this makes the calculation easier. • DO NOT round the answer!		e.g. Estimate: $\frac{3.91 \times 8789.8}{620.9 \times 0.492}$ $\frac{3.91 \times 8789.8}{620.9 \times 0.492} \approx \frac{4 \times 9000}{600 \times 0.5}$ $\approx \frac{3600}{300}$ ≈ 120

1b. Indices, roots, reciprocals and hierarchy of operations (N2, N3, N6, N7, N14)

X i)	Use index notation for positive powers of 10	• Count how many zero's there are after the 1 and write 10 to the power of this number. • Write a 1 followed by the same number of zero's as the power 10 is raised to.	e.g. $10\,000\,000 = 10^7$ e.g. $10^2 = 100$
ii)	Use index notation for negative powers of 10	• Count how many zero's there are in front of the 1 and write 10 to the power of the negative of this number. • Use the positive of the power 10 is raised to and write a 1 with this number of zero's in front with a decimal point after the first.	e.g. $0.000\,000\,1 = 10^{-7}$ e.g. $10^{-2} = 0.01$

iii)	Recognise common powers	Recall that the positive power of a number tells us how many times to use that number in a multiplication.		e.g. $3^4 = 3 \times 3 \times 3 \times 3$ e.g. $7^2 = 7 \times 7$
	Powers of 2	$2^1 = \mathbf{2}, 2^2 = \mathbf{4}, 2^3 = \mathbf{8}, 2^4 = \mathbf{16}, 2^5 = \mathbf{32}, 2^6 = \mathbf{64}, 2^7 = \mathbf{128}, 2^8 = \mathbf{256}. 2^9 = \mathbf{512}, 2^{10} = \mathbf{1024}$		
	Powers of 3	$3^1 = \mathbf{3}, 3^2 = \mathbf{9}, 3^3 = \mathbf{27}, 3^4 = \mathbf{81}, 3^5 = \mathbf{243}$		
	Powers of 4	$4^1 = \mathbf{4}, 4^2 = \mathbf{16}, 4^3 = \mathbf{64}, 4^4 = \mathbf{256}, 4^5 = \mathbf{1024}$		
	Powers of 5	$5^1 = \mathbf{5}, 5^2 = \mathbf{25}, 5^3 = \mathbf{125}, 5^4 = \mathbf{625}$		
iv)	Estimate roots of any given positive number	• Identify the square (or cube) numbers immediately above and below the number we are trying to find the square (or cube) root of. • The desired root must lie between the integer roots of the square numbers immediately above and below.		e.g. Between which two integers does $\sqrt{42}$ lie? • Next square number is $\mathbf{49}$. • Previous square number is $\mathbf{36}$. • $\sqrt{36} = \mathbf{6}, \sqrt{49} = \mathbf{7}$ • So: $\sqrt{42}$ lies between : $\mathbf{6}$ & $\mathbf{7}$
v)	Find the value of calculations involving positive indices	Recall that a positive power of a number tells us how many times to use that number in a multiplication.		e.g. $3^4 = 3 \times 3 \times 3 \times 3$ e.g. $7^2 = 7 \times 7$
	Find the value of calculations involving negative indices	To calculate a negative power: • Calculate the equivalent positive power. • Then take the reciprocal.	$a^{-n} = \frac{1}{a^n}$	e.g. Calculate $\mathbf{4^{-3}}$. • $4^3 = 64$ • $4^{-3} = \mathbf{\frac{1}{64}}$
	Find the value of calculations involving fractional indices	The denominator of the fractional power gives the type of root to evaluate.	$a^{\frac{1}{n}} = \sqrt[n]{a}$	e.g. $\mathbf{64^{\frac{1}{2}}} = \sqrt{\mathbf{64}} = \mathbf{8}$ e.g. $\mathbf{125^{\frac{1}{3}}} = \sqrt[3]{\mathbf{125}} = \mathbf{5}$
vi)	Use powers of 0 and 1	Anything to the power of $0 = 1$	$a^0 = 1$	e.g. $\mathbf{5^0} = \mathbf{1}$
		Anything to the power $1 =$ itself	$a^1 = a$	e.g. $\mathbf{5^1} = \mathbf{5}$
vii)	Use index laws to simplify or evaluate numerical expressions	*Multiplication* • Add the powers	$a^m \times a^n = a^{m+n}$	e.g. $\mathbf{2^2} \times \mathbf{2^3} = \mathbf{2^5}\ (= \mathbf{32})$
		Division • Subtract the powers	$a^m \div a^n = a^{m-n}$	e.g. $\mathbf{3^9} \div \mathbf{3^4} = \mathbf{3^5}\ (= \mathbf{243})$
		Brackets • Multiply the powers	$(a^m)^n = a^{mn}$	e.g. $(\mathbf{7^4})^{\mathbf{3}} = \mathbf{7^{12}}$

1c. Factors, multiples and primes (N3, N4)

i)	Factors	A factor is a number that divides into another number	e.g. factors of 6: 1, 2, 3 and 6
ii)	Multiples	A multiple is a number from the times tables	e.g. multiples of 4: 4, 8, 12, 16, 20, ………
iii)	Prime number	A prime number is a number with exactly 2 factors 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	
iv)	Product	The answer when two or more numbers are multiplied together.	e.g. Product of 3 & 7: $3 \times 7 = \mathbf{21}$
v)	Prime factor decomposition	Writing a number as a *product of its prime factors*	
vi)	Highest common factor (HCF)	The highest number that divides exactly into two or more numbers.	 e.g. The HCF of 12 & 8: $\mathbf{4}$
vii)	Lowest common multiple (LCM)	The smallest positive number that is a multiple of two or more numbers.	 e.g. The LCM of 12 & 8: $\mathbf{24}$

1d. Standard form (N9)

i)	Convert a small number to standard form	• Count the number of zero's in front of the first significant figure (including the one in front of the decimal point). • The power of ten is negative followed by this number.	e.g. $\mathbf{0.00000037}$ $= \mathbf{3.7 \times 10^{-7}}$
ii)	Convert a large number into standard form	• Count the number of place value position there are after the first significant figure. • The power of ten is positive followed by this number.	e.g. $\mathbf{147\ 100\ 000\ 000}$ $= \mathbf{1.47 \times 10^{11}}$
iii)	Converting to a small ordinary number	• Look at the digit after the negative in the power of 10. • Write this may zero's in front of the first sig. fig. • Reposition the decimal place between the first and second zero.	e.g. $\mathbf{2.4 \times 10^{-6}}$ $= \mathbf{0.0000024}$
iv)	Adding or subtracting numbers in standard form	• Convert the numbers to ordinary numbers. • Add. • Convert the sum to standard form.	e.g. $(\mathbf{2.3 \times 10^4}) + (\mathbf{6.4 \times 10^3})$ $= 23000 + 6400$ $= 29400$ $= \mathbf{2.94 \times 10^4}$

v)	Multiplying numbers in standard form	• Multiply the numbers between one and 10 at the front. • Use index law for multiplication for the powers of 10. • If necessary increase the power of ten by one to ensure the initial number is between 1 and 10.	e.g. $(\mathbf{4.5} \times \mathbf{10^3}) \times (\mathbf{3} \times \mathbf{10^5})$ $= 13.5 \times 10^{3+5}$ $= 13.5 \times 10^8$ $= \mathbf{1.35} \times \mathbf{10^9}$
vi)	Dividing numbers in standard form	• Divide the numbers between one and 10 at the front. • Use index law for division for the powers of 10. • If necessary decrease the power of ten by one to ensure the initial number is between 1 and 10.	e.g. $(\mathbf{2.5} \times \mathbf{10^{11}}) \div (\mathbf{5} \times \mathbf{10^{13}})$ $= 0.5 \times 10^{-2}$ $= \mathbf{5} \times \mathbf{10^{-3}}$
1d. Surds (N8)			
i)	Multiply	$\sqrt{a} \times \sqrt{b} = \sqrt{ab}$ and $\sqrt{a} \times \sqrt{a} = a$	e.g. $\sqrt{2} \times \sqrt{3} = \sqrt{6}$ and $\sqrt{3} \times \sqrt{3} = 3$
ii)	Divide	$\frac{\sqrt{a}}{\sqrt{b}} = \sqrt{\frac{a}{b}}$	e.g. $\frac{\sqrt{6}}{\sqrt{2}} = \sqrt{\frac{6}{2}} = \sqrt{3}$
iii)	Add and subtract	$\sqrt{a} + \sqrt{b}$ cannot simplify	e.g. $\sqrt{3} + \sqrt{2} = \sqrt{3} + \sqrt{2}$
		But $\sqrt{a} + \sqrt{a} = 2\sqrt{a}$	e.g. $5\sqrt{2} - 2\sqrt{2} = 3\sqrt{2}$
iv)	Simplify	$\sqrt{50} = \sqrt{25 \times 2} = \sqrt{25} \times \sqrt{2} = 5\sqrt{2}$	e.g. $\sqrt{50} + \sqrt{18} = 5\sqrt{2} + 3\sqrt{2} = 8\sqrt{2}$
v)	Rationalise the denominator	Multiply numerator and denominator (use equivalent fractions) by whatever will result in the denominator simplifying to an integer.	e.g. $\frac{1}{\sqrt{7}} = \frac{1}{\sqrt{7}} \times \frac{\sqrt{7}}{\sqrt{7}} = \frac{7}{\sqrt{7}}$
			e.g. $\frac{1}{5+\sqrt{2}} = \frac{1}{5+\sqrt{2}} \times \frac{5-\sqrt{2}}{5-\sqrt{2}} = \frac{5-\sqrt{2}}{3}$

Year 9 Mathematics
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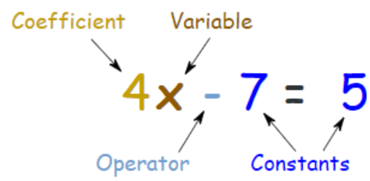
Algebra: the basics

Definitions

1.	Variable	A letter representing a varying or unknown quantity.	
2.	Coefficient	A number which multiplies a variable e.g. 4 is the coefficient in 4a	
3.	Term	One part of an expression/equation/formula Can involve multiplying and dividing coefficients and variables Separated from other terms by addition and subtraction	e.g. 4c $\frac{w}{5}$
4.	Like terms	Terms that have the same variable but have different coefficients	e.g. c + 4c are like terms c^2 and c^3 are not like terms
5.	Constant	A fixed value. A number on its own or sometimes a letter such as a, b or c to represent a fixed number.	
6.	Expression	One or a group of terms. Can include variables, constants, operators and grouping symbols. No 'equals' sign	e.g. 3y -3 $3y^2 + y^3$
7.	Equation	Contains an 'equals' sign, = Has at least one variable	e.g. 3y – 3 = 12
8.	Formula	A special type of equation that shows the relationship between a set of variables	
9.	Formulae	Plural of 'formula'	
10.	Identity	An equation that is true no matter what values are chosen, ≡	e.g. 3y ≡ 2y – y for any value of y.
11.	Subject	The variable on its own on one side of the equals sign.	
12.	Substitute	Replace a variable with a number.	$a = 3, b = 2 \text{ and } c = 5.$ **Find:** 1. $2a = 2 \times 3 = 6$ 2. $3a - 2b = 3 \times 3 - 2 \times 2 = 5$ 3. $7b^2 - 5 = 7 \times 2^2 - 5 = 23$
13.	Simplify	Minimising the size of an expression	

14.	Factorise	Splitting an expression into a product of factors	
15.	Expand	Removing brackets by using multiplication	
16.	Solve	Find the value of an unknown	
Algebraic Notation			
17.	Adding like terms	Add the coefficients	$b + 2b = 3b$
18.	Subtracting like terms	Subtract the coefficients	$5b - 4b = b$
19.	Multiplying like terms	If the base is the same, add the powers	$b \times b = b^2$
20.	Dividing terms	If the base is the same, subtract the powers	$b^5 \div b^2 = b^3$
21.	Adding different terms	Cannot combine if the terms are different.	$b + 2c = b + 2c$
22.	Subtracting different terms	Cannot combine if the terms are different.	$3c - 4 = 3c - 4$
23.	Multiplying different terms	Combine with no '×' sign	$d \times e = de$
24.	Multiplying different terms with coefficients	Combine with no '×' sign, multiply the coefficients	$2d \times 3e = d6e$
25.	Dividing different terms	Write as fractions with no '÷' sign	$3d \div e = \frac{3d}{e}$
26.	Dividing different terms with coefficients	Write as fractions with no '÷' sign, simplify the coefficients where possible.	$14d \div 7e = \frac{2d}{e}$
Expanding (single brackets)			
27.	Multiply all the terms inside the bracket, by the term on the outside.		
28.	$3(a + 4) = 3a + 12$	$\begin{array}{c\|c\|c} \times & 2x & -3 \\ \hline 2x & 4x^2 & -6x \end{array}$	$4x^2 - 6x$
Factorising (single brackets)			
29.	• Find the highest common factor of the terms • This goes outside the bracket • Divide each term by the factor to get the new terms inside the bracket • Always check by expanding your bracket	$2x + 4y$ $5x^2y - 10xy$	$2(x + 2y)$ $5xy(x - 2)$
Expressions			
30.	Linear	Can be represented by a straight line No indices above 1	e.g. $2x + 2$
31.	Quadratic	An expression where the highest index is 2	e.g. $2x^2 + 2x + 2$

Expanding double brackets

32.	Everything in the first bracket must be multiplied by everything in the second	
33.	**Grid method** $(x+4)(x+7)$ $\begin{array}{c\|c\|c} \times & x & +4 \\ \hline x & x^2 & 4x \\ \hline +7 & 7x & 28 \end{array}$ $= x^2 + \underline{4x + 7x} + 28$ $= x^2 + 11x + 28$	**FOIL method** FIRST : $(x+3)(x-4)$ gives $x \times x = x^2$ OUTER : $(x+3)(x-4)$ gives $x \times (-4) = -4x$ INNER : $(x+3)(x-4)$ gives $3 \times x = 3x$ LAST : $(x+3)(x-4)$ gives $3 \times (-4) = -12$

Factorising a quadratic expression

34.	Factorising a quadratic in the form of $ax^2 + bx + c$	Multiply to 5 Factorise $x^2 + 5x + 6$ ← Add to 6 2 and 3 add to 5 2 and 3 multiply to 6 $(x+2)(x+3)$ Check: $(x+2)(x+3) = x^2 + 5x + 6$
35.	Difference of two squares	A special type of quadratic which only has two terms. One term is subtracted from the other $x^2 - 25 = x^2 - 5^2 = (x+5)(x-5)$ $y^2 - 49 = y^2 - 7^2 = (y+7)(y-7)$ $a^2 - 16 = a^2 - 4^2 = (a+4)(a-4)$

Equations

36.	To solve equations we need to use inverse operations
37.	What ever you do to one side of the equals sign you must do the same to the other

38.	One step	$x+4=7$ $(-4)\quad(-4)$ $x=11$ $x-5=12$ $(+5)\quad(+5)$ $x=17$ $3x=18$ $(\div 3)\quad(\div 3)$ $x=1$ $\frac{x}{4}=6$ $(\times 4)\quad(\times 4)$ $x=24$	
39.	Two step	Requires the use of two inverse operations	$2x-7=19$ $2x=26$ $x=13$
40.	With brackets	Expand the brackets first $5(2x+1)=35$ $10x+5=35$ $10x=30$ $x=3$	OR if possible divide by the number outside of the bracket first $4(2x+4)=20$ $2x+4=5$ $2x=1$ $x=\frac{1}{2}$
41.	Unknowns on both sides	Start by eliminating the unknown from one of the signs.	$5x+2=3x-8$ $2x+2=-8$ $2x=-10$ $x=-5$
42.	With fractions	Eliminate any terms that are being added or subtracted separate from the fraction first. $\frac{f}{5}+2=8$ $\frac{f}{5}=6$ $f=30$	If everything is part of the fraction then multiply by the denominator first. $\frac{f+2}{5}=8$ $f+2=40$ $f=38$

Changing the subject of a formula (rearranging)

43.	Always use inverse operations to isolate the term you have been asked to make the subject		
	If the letter you want as the subject appears twice you will need to factorise		
	Make u the subject: $v=u+at$ $(-\boldsymbol{at})$ $v-at=u$ So $u=v-at$	Make u the subject: $v^2=u^2+2as$ $(-\boldsymbol{2as})$ $v^2-2as=u^2$ $(\sqrt{\ })$ $\sqrt{v^2-2as}=u$ So $u=\sqrt{v^2-2as}$	Make m the subject: $I=mv-mu$ $(\boldsymbol{Factorise})$ $I=m(v-u)$ $(\div(\boldsymbol{v-u}))$ $\frac{I}{v-u}=m$ So $m=\frac{I}{v-u}$

<table>
<tr><td colspan="3">Iteration</td></tr>
<tr><td>44.</td><td>Iteration</td><td>The act of repeating a process to generate a sequence of outcomes or with the aim of of appraoching a desired result e.g. finding a solution to an equation</td></tr>
<tr><td>45.</td><td>Iterative sequence</td><td>The relationship between consecutive terms</td></tr>
<tr><td>46.</td><td>Roots</td><td>Solutions to an equation</td></tr>
<tr><td>47.</td><td>Change of sign</td><td>Two values with a root between them</td></tr>
<tr><td colspan="3">Sequences</td></tr>
<tr><td>48.</td><td>Sequence</td><td>An order pattern of numbers or diagrams</td></tr>
<tr><td>49.</td><td>Term</td><td>One of the numbers or diagrams in a sequence</td></tr>
<tr><td>50.</td><td>Term to term rule</td><td>The rule for moving from one term to the next in a sequence</td></tr>
<tr><td>51.</td><td>Formula</td><td>A rule written to describe a realtionship between twp quantities</td></tr>
<tr><td>52.</td><td>Arithmetic sequence</td><td>A sequence where the term to term rule is to addd or subtract the same amount each time</td></tr>
<tr><td rowspan="2">53.</td><td rowspan="2">Quadratic sequence</td><td>A sequence where the term to term rule is changing by the same amount each time</td></tr>
<tr><td>The second difference is a constant amount.</td></tr>
<tr><td>54.</td><td>Geometric sequence</td><td>A sequence where the term to term rule is to multiply by the same amount each time</td></tr>
<tr><td rowspan="2">55.</td><td rowspan="2">Common ratio</td><td>The value a geometric sequence is multiplied by from one term to the next</td></tr>
<tr><td>Denoted by the letter r</td></tr>
<tr><td>56.</td><td>Series</td><td>The sum of the terms in a sequence</td></tr>
<tr><td>57.</td><td>Position to term rule</td><td>The rule for finding any value of a sequence</td></tr>
<tr><td rowspan="2">58.</td><td rowspan="2">nth term rule for an arithmetic sequence</td><td>The rule to find any term in a sequence of numbers</td></tr>
<tr><td>

- Find the common difference between the terms
- This becomes you coefficient of n (this is the times table the sequenc is linked to)
- The number you need to add or subtract to get to the second term becomes the second term in the nth term rule

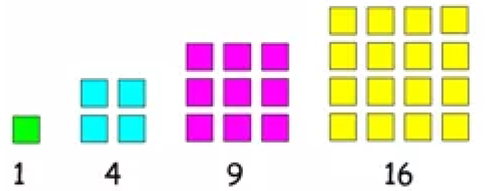
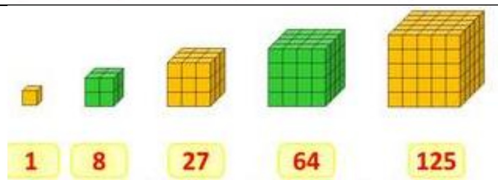
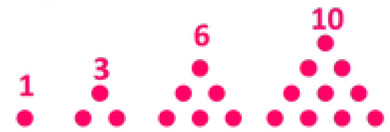
</td></tr>
<tr><td>59.</td><td>Nth term for a quadratic sequence</td><td>

- Find the first difference
- Find the second difference
- Halve the second difference and multiply by n^2 to gain a new sequence of an^2
- Generate the first few term sof this seuence then subtract from the original sequence

</td></tr>
</table>

		• Find the nth term of the remianing sequence $bn + c$ • The entire nth term is then $an^2 + bn + c$
60.	nth term for a geometric sequence	• Divide the second sequence by the first to find the common ratio, r • The nth term is ar^{n-1} where a is the first term and n is the term position in the sequence
61.	Finite	Has a final point
62.	Infinite	Carries on forever
63.	Ascending	Increases
64.	Descending	Decreases
65.	Linear function	An aruthmetic sequence that can be represented by a straight line graph

Special Sequences

66.	Square numbers	1, 4, 9, 16, 25, 36, 49, 64, 81, 100	
67.	Cube numbers	1, 8, 27, 64, 125	
68.	Triangular numbers	1, 3, 6, 10, 15, 21, 28	
69.	Fibonacci sequence	A sequence where each term is the sum of the two previous terms	
		e.g. 1, 1, 2, 3, 5, 8, 13, 21…	