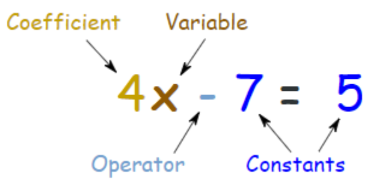
Year 7 Mathematics
Extending
Term 2

Algebra –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. $3y \equiv 2y - y$ 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.	$a = 3, b = 2$ 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.	$3(a + 4) = 3a + 12$	see grid below	$4x^2 - 6x$

$\times$	$2x$	-3
$2x$	$4x^2$	$-6x$

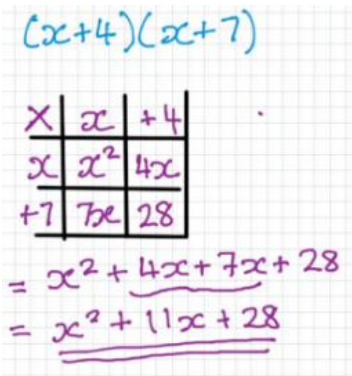
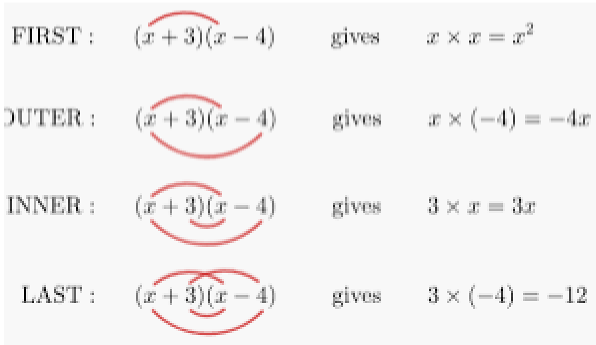
Factorising (single brackets)

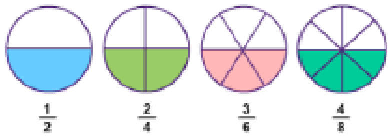
29.	• Find the highest common factor of the terms • This goes outside the bracket • Divide each term by the factor to get the new terms inside the bracket • Always check by expanding your bracket	$2x + 4y$ $5x^2y - 10xy$	$2(x + 2y)$ $5xy(x - 2)$

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  	FOIL method 

Fractions			
34.	Fraction	Part of a whole	
35.	Numerator	The number on the top of the fraction	$\frac{numerator}{denominator}$
36.	Denominator	The number on the bottom of the fraction	
37.	Equivalent fractions	Fractions that have the same value but look different.	
38.	Improper fraction	A fraction where the numerator is larger than the denominator.	e.g. $\frac{4}{3}$
39.	Mixed number	A number made from integer and fraction parts.	e.g. $2\frac{2}{3}$
40.	Unit fraction	A fraction that has a numerator of 1	
41.	Reciprocal	The reciprocal of a number is 1 divided by the number.	e.g. the reciprocal of 3 is $\frac{1}{3}$
		Dividing by a number is the same as multiplying by its reciprocal	e.g. $\times$ by $\frac{1}{3}$ is the same as $\div$ by 3
Fractions - processes			
42.	Simplifying fractions	Divide the numerator and denominator by the HCF.	$\frac{24}{30} = \frac{4}{5}$
43.	Finding equivalent fractions	Multiply the numerator and denominator by the same number	$\frac{4 \times 2 = 8}{8 \times 2 = 16}$
44.	Comparing fractions	Write them with a common denominator	
45.	Fraction of an amount	Amount divided by the denominator then multiplied by the numerator	e.g. $\frac{5}{7}$ of 42 $42 \div 7 \times 5 = 30$
46.	Multiply fractions	Multiply the numerators and multiply the denominators	$\frac{6}{7} \times \frac{4}{5} = \frac{6 \times 4}{7 \times 5} = \frac{24}{35}$
47.	Divide fractions	• Flip the second fraction (find the reciprocal). • Change the divide to multiply. • Multiply the fractions.	$\frac{4}{7} \div \frac{5}{6} = \frac{4}{7} \times \frac{6}{5} = \frac{4 \times 6}{7 \times 5} = \frac{24}{35}$
48.	Add or subtract fractions	• Write as fractions with a common denominator. • Add or subtract the numerators	$\frac{2}{8} + \frac{1}{6} = \frac{6}{24} + \frac{4}{24} = \frac{10}{24} = \frac{5}{12}$
49.	Convert improper fractions to mixed numbers	• Divide the numerator by the denominator • The answer gives the whole number part.	$\frac{43}{6} = 7\frac{1}{6}$

		• The remainder becomes the numerator of the fraction part with the same denominator.	
50.	Convert mixed numbers to improper fractions	• Multiply the denominator by the whole number part. • Add the numerator to this. • Put the answer to this back over the denominator	$7\frac{1}{6}=\frac{6\times7+1}{6}=\frac{43}{6}$
51.	Adding and subtracting mixed numbers	• Convert mixed numbers to improper fractions • Transform both fractions so they have the same denominator • Add or subtract the numerators Convert back to mixed number if applicable	
52.	Multiplying mixed numbers	• Convert mixed numbers to improper fractions • Multiply numerators and multiply the denominators Convert back to mixed number if applicable	
53.	Dividing mixed numbers	• Convert mixed numbers to improper fractions • Flip the second fraction (find the reciprocal) • Change the divide sign to a multiply • Multiply the fractions Convert back to mixed number if applicable	

FDP Conversions

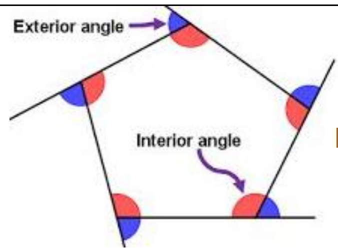
54.	Percentage to decimal	Divide by 100
55.	Decimal to percentage	Multiply by 100
56.	Fraction to percentage	Find an equivalent fraction with 100 as the denominator
57.	Percentage to fraction	Write as a fraction over 100 then simplify
58.	Fraction to decimal	Carry out division or convert to a percentage first
59.	Decimal to fraction	Use place value to find the denominator and simplify or convert to a percentage first

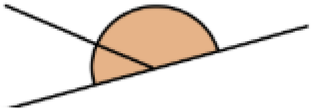
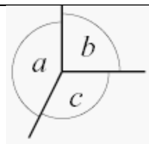
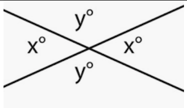
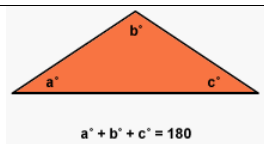
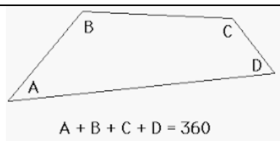
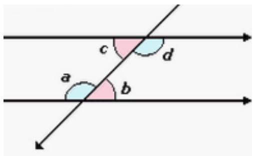
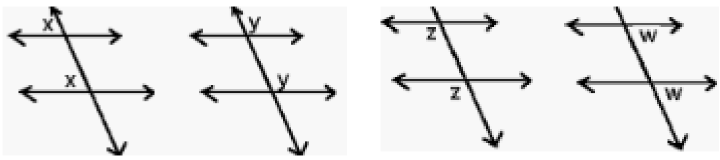
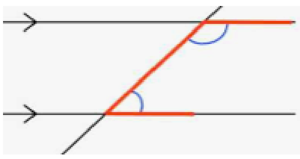
Basics to memorise

60.	Fraction	$\frac{1}{100}$	$\frac{1}{10}$	$\frac{1}{8}$	$\frac{1}{5}$	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{1}{2}$	$\frac{2}{3}$	$\frac{3}{4}$
	Decimal	0.01	0.1	0.125	0.2	0.25	$0.\dot{3}$	0.5	$0.\dot{6}$	0.75
	Percentage	1%	10%	12.5%	20%	25%	$33.\dot{3}\%$	50%	$66.\dot{7}\%$	75%

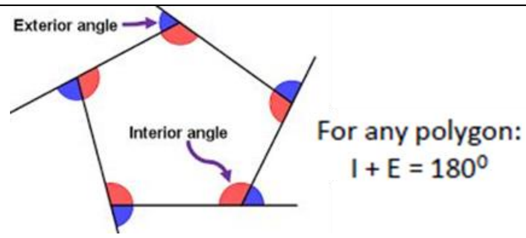
Year 7 Mathematics
Extending
Term 3

Angle definitions

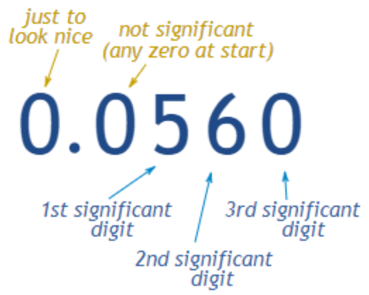
1.	Angle	A measure of turn, measured in degrees ◦	
2.	Protractor	Instrument used to measure the size of an angle	
3.	Acute angle	An angle less than 90◦	
4.	Right angle	A 90◦ angle	
5.	Obtuse angle	An angle more than 90◦ but less than 180◦	
6.	Reflex angle	An angle more than 180◦	
7.	Parallel lines	Lines that are equal distance apart that will never meet even when extended	
8.	Perpendicular lines	Lines that intersect at a right angle	
9.	Polygon	A 2D shape with straight lines only	
10.	Regular polygon	A polygon where: All sides are the same length All angles are the same size	
11.	Interior angles (I)	An angle inside a polygon	 For any polygon: $I + E = 180^0$

Basic angle rules		
12.	Angles on a straight line add to 180°	
13.	Angles around a point add up to 360°	
14.	Vertically opposite angles are equal	
15.	Angles in a triangle add to 180°	
16.	Angles in a quadrilateral add up to 360°	
Angles on parallel lines		
17.	Alternate angles are equal	
18.	Corresponding angles are equal	
19.	Co-interior angles add up to 180°	

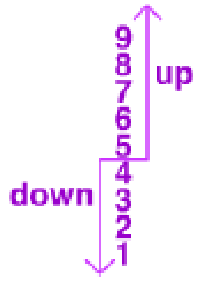
Angles in polygons

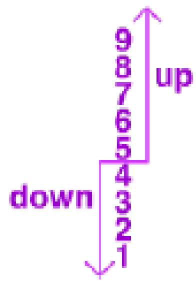
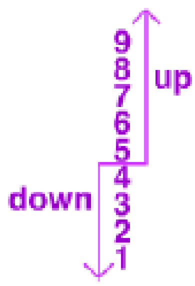
20.	Interior and exterior angles add to give 180°	
21	Sum of interior angles	For a 'n' sided polygon Sum of interior angles = 180 x (n-2)
22.	Size of one interior angle	For a 'n' sided polygon Interior angle = $\frac{180\ x\ (n-2)}{n}$
23.	Sum of exterior angles	For all polygons, sum of exterior angles = 360°
24.	Regular polygons	Exterior angle = 360 ÷ number of sides
		Number of sides = 360 ÷ exterior angle
		Interior angle = 180 – exterior angle

Decimals

25.	Ascending order	A set of numbers arranged from smallest to biggest.	
26.	Descending order	A set of numbers arranged from biggest to smallest.	
27.	Decimal	A number with a decimal point in it, which can be negative or positive.	
28.	Terminating decimal	A decimal that has digits that end.	0.25 (it has two decimal digits) 3.0375 (it has four decimal digits)
29.	Recurring decimal	A decimal with a digit or groups of digits that repeat forever.	$\frac{1}{3} = 0.333... = 0.\dot{3} = 0.\overline{3}$ Fraction Ways to show recurring decimals
30.	Decimal place	The number of digits after the decimal point	
31.	Rounding	Changing a number to a simpler, easy to use value.	
32.	Approximate	An easier figure to use close to the value.	
33.	Significant figure	The digits of a number that express a size to a given degree of accuracy	

Rounding to decimal places

34.	• Count the number of decimal places you need • Look at the number directly to the right of that digit to decide if it rounds up or down • 5 or more means it rounds up; 4 or less means it rounds down		
35.	e.g. 256.1873	256.1 | 873	To 1 d.p. is 256.2
		256.18 | 73	To 2 d.p. is 256.19
		256.187 | 3	To 3 d.p. is 256.187

<table>
<tr><th colspan="4">Rounding large numbers to significant figures</th></tr>
<tr><td>36.</td><td colspan="2">• Count the number of digits you need from the left
• Look at the number to the right of the digit to decide if it rounds up or down
• 5 or more means it rounds up; 4 or less means it rounds down
• Replace remaining digits with zeros as placeholders</td><td></td></tr>
<tr><td rowspan="3">37.</td><td rowspan="3">e.g. 256. 1873</td><td>2 | 56.1873</td><td>To 1 s.f. is 300</td></tr>
<tr><td>25 | 6.1873</td><td>To 2 s.f. is 260</td></tr>
<tr><td>256 | .1873</td><td>To 3 s.f. is 256</td></tr>
<tr><th colspan="4">Rounding small numbers to significant figures</th></tr>
<tr><td>38.</td><td colspan="2">• Zeros are not significant until after the first non-zero term
• Find the first non-zero term and count the number of digits you need from there
• Look at the number directly to the right of that digit to decide if it rounds up or down
• 5 or more means it rounds up; 4 or less means it rounds down</td><td></td></tr>
<tr><td rowspan="3">39.</td><td rowspan="3">e.g. 0.0023681</td><td>0.002 | 3681</td><td>To 1 s.f. is 0.002</td></tr>
<tr><td>0.0023 | 681</td><td>To 2 s.f. is 0.0024</td></tr>
<tr><td>0.00236 | 81</td><td>To 3 s.f. is 0.00237</td></tr>
</table>