## Fractions

| 1. | Improper fraction | A fraction where the numerator is larger than the denominator. | e.g. $\quad \frac{4}{3}$ |
| :---: | :---: | :---: | :---: |
| 2. | Mixed number | A number made from integer and fraction parts. | e.g. $2 \frac{2}{3}$ |
| 3. | Unit fraction | A fraction that has a numerator of 1 |  |
| 4. | Reciprocal | The reciprocal of a number is 1 <br> divided by the number. e.g. the r | e.g. the reciprocal of 3 is $\frac{1}{3}$ |
|  |  | Dividing by a number is the same <br> as multiplying by its reciprocal e.g. $\times$ by | e.g. $\times$ by $\frac{1}{3}$ is the same as $\div$ by 3 |
| 5. | Convert improper fractions to mixed numbers | - Divide the numerator by the denominator <br> - The answer gives the whole number part. <br> - The remainder becomes the numerator of the fraction part with the same denominator. | $\frac{43}{6}=7 \frac{1}{6}$ |
| 6. | Convert mixed numbers to improper fractions | - Multiply the denominator by the whole number part. <br> - Add the numerator to this. <br> - Put the answer to this back over the denominator | $7 \frac{1}{6}=\frac{6 \times 7+1}{6}=\frac{43}{6}$ |
| 7. | Adding and subtracting mixed numbers | - Convert mixed numbers to improper <br> - Transform both fractions so they have <br> - Add or subtract the numerators Convert back to mixed number if app | actions <br> the same denominator <br> cable |
| 8. | Multiplying mixed numbers | - Convert mixed numbers to improper <br> - Multiply numerators and multiply the Convert back to mixed number if app | actions denominators icable |
| 9. | Dividing mixed numbers | - Convert mixed numbers to improper <br> - Flip the second fraction (find the recip <br> - Change the divide sign to a multiply <br> - Multiply the fractions <br> Convert back to mixed number if app | actions ocal) <br> cable |

## Index laws

| 10. | Index | A small number to the upper right of a base number that shows how many <br> times the base number is multiplied by itself. |
| :---: | :--- | :--- |
| 11. | Power | Another word for an index. |
| 12. | Indices | The plural of index. |


| 13. | Index form | A number written to the power of an index. |  |
| :---: | :---: | :---: | :---: |
| 14. | Multiplying | Add the powers | $x^{7} \times x^{6}=x^{13}$ |
| 15. | Dividing | Subtract the powers | $x^{5} \div x^{6}=x^{-1}$ |
| 16. | Brackets | Multiply the powers | $\left(x^{2}\right)^{3}=x^{6}$ |
| 17. | Power of 0 | Always = 1 | $x^{0}=1$ |
| 18. | Negative | Means "1 over" | $x^{-n}=\frac{1}{x^{n}}$ |
| 19. | Unit Fraction | Means root | $x^{\frac{1}{n}}=\sqrt[n]{x}$ |
| 20. | Fractional | Means root and bracket | $x^{\frac{a}{n}}=(\sqrt[n]{x})^{a}$ |
| Standard form |  |  |  |
| 21. | Standard form | A number written in the form: $A \times 10^{n}$, where $A$ is between 1 and 10 . |  |
| 22. | Scientific notation | Another name for standard form |  |
| 23. | 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). <br> - The power of ten is negative followed by this number. | $\begin{aligned} \text { e.g. } & 0.00000037 \\ =3.7 & \times 10^{-7} \end{aligned}$ |
| 24. | Convert a large number into standard form | - Count the number of place value position there are after the first significant figure. <br> - The power of ten is positive followed by this number. | $\begin{aligned} & \text { e.g. } 147100000000 \\ & =1.47 \times 10^{11} \end{aligned}$ |
| 25. | Converting to a small ordinary number | - Look at the digit after the negative in the power of 10. <br> Write this may zero's in front of the first sig. fig. <br> - Reposition the decimal place between the first and second zero. | $\begin{aligned} \text { e.g. } \quad 2.4 & \times 10^{-6} \\ = & 0.0000024 \end{aligned}$ |
| 26. | Adding or subtracting numbers in standard form | - Convert the numbers to ordinary numbers. <br> - Add. <br> - Convert the sum to standard form. | $\text { e.g. } \begin{gathered} \left(\mathbf{2 . 3} \times \mathbf{1 0}^{\mathbf{4}}\right)+\left(\mathbf{6 . 4} \times \mathbf{1 0}^{\mathbf{3}}\right) \\ =23000+6400 \\ =29400 \\ =2.94 \times \mathbf{1 0}^{4} \end{gathered}$ |


| 27. | Multiplying numbers in standard form | - Multiply the numbers between one and 10 at the front. <br> - Use index law for multiplication for the powers of 10. <br> - If necessary increase the power of ten by one to ensure the initial number is between 1 and 10 . | $\text { e.g. } \begin{aligned} (\mathbf{4 . 5} & \left.\times \mathbf{1 0}^{\mathbf{3}}\right) \times\left(\mathbf{3} \times \mathbf{1 0}^{\mathbf{5}}\right) \\ & =13.5 \times 10^{3+5} \\ & =13.5 \times 10^{8} \\ & =\mathbf{1 . 3 5} \times \mathbf{1 0}^{\mathbf{9}} \end{aligned}$ |
| :---: | :---: | :---: | :---: |
| 28. | Dividing numbers in standard form | - Divide the numbers between one and 10 at the front. <br> - Use index law for division for the powers of 10. <br> - If necessary, decrease the power of ten by one to ensure the initial number is between 1 and 10 . | $\text { e.g. }\left(\mathbf{2 . 5} \times \mathbf{1 0}^{\mathbf{1 1}}\right) \div\left(5 \times \mathbf{1 0}^{13}\right)$ |

## Similarity and Congruence in 2D

| 1. | Congruent | Exactly the same shape and size |  |
| :---: | :--- | :--- | :--- | :--- |
| 2. | Similar | Two shapes where one is an enlargement of another |  |
|  |  | Corresponding angles are equal | Corresponding sides are in the same ratio |
| 3. | Scale factor | The proportion by which the dimensions of an object will increase or decrease by |  |
| 4. | Linear scale <br> factor (LSF) | The scale factor/ratio of sides of two <br> similar shapes | LSF $=\frac{\text { length from large shape }}{\text { length from small shape }}$ |
| 5. | Area scale <br> factor (ASF) | The scale factor ratio of areas/surface <br> areas of two similar shapes | ASF $=\frac{\text { Area of large shape }}{\text { lArea of small shape }}$ |
| 6. | Volume scale <br> factor (VSF) | The scale factor/ratio of volumes of two <br> similar shapes | $V S F=\frac{\text { volume of large shape }}{\text { volume of small shape }}$ |

## Two triangles are congruent if...

| 7. | SSS | All 3 sides are equal |  |
| :---: | :---: | :---: | :---: |
| 8. | SAS | 2 sides and the included angle are equal |  |
| 9. | ASA | 2 angles and the corresponding side are equal |  |
| 10. | RHS | The right angle, hypotenuse and one other side are equal |  |
| Vectors |  |  |  |
| 11. | Magnitude | Size |  |



Year 11 Mathematics
Foundation
HT 2

## Algebra definitions

| 1. | Equation | A mathematical statement containing an equals sign (=) to show that two <br> expressions are equal |
| :---: | :--- | :--- | :--- |
| 2. | Formula | A rule describing the relationship between different variables |
| 3. | Formulae | The plural of formula |
| 4. | Function | A relation involving one or more variables |
| 5. | Roots | Solutions to an equation |
|  |  |  |
| 6. | Identity | An equation that is true for any value of x |
| 7. | Substitute | Renoted using $\equiv$ |
| 8. | Subject | The variable on its own on one side of the equals sign is said to be the 'subject' of $a$ <br> formula |
| 9. | Rearrange | Change positons of terms using inverse operations |

## Changing the subject of a formula (rearranging)

Always use inverse operations to isolate the term you have been asked to make the subject
10.

$$
\begin{gathered}
\text { Make } u \text { the subject: } \\
\begin{array}{c}
v=u+a t \\
(-\boldsymbol{a t}) \\
v-a t=u \\
\text { So } \\
u=v-a t
\end{array}
\end{gathered}
$$

Types of graphs/functions



## Simultaneous equations

16. 

| Simultaneous <br> equations |
| :--- |

Two equations where there are two unknown which have the same value in each

## Solving simultaneous equations

| 17. | Elimination | Add or subtract one equation from another to eliminate a variable |  |
| :---: | :---: | :---: | :---: |
|  |  | If the matching coeefieicents have the same sign then subtract the equations <br> $\checkmark$ Same <br> $\checkmark$ Subtract <br> $\checkmark$ Substitute | If the matching coefficients have different signs then add the equations <br> $\checkmark$ Different <br> $\checkmark$ Add <br> $\checkmark$ Substitute |
| 18. | Substitution | Rearrange so the subject of one equation is a single variable |  |
|  |  | Substitute this into the second equation |  |
| 19. | Graphically | The points of intersection of two graphs are the solutions to the simultaneous equations |  |

