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| **Topic/Skill**  | **Definition/Tips** | **Example****Topic: Perimeter and Area**  |
| 1. Perimeter | The **total distance** around the **outside** of a shape.Units include: $mm, cm, m $etc. | Image result for perimeter  $P=8+5+8+5=26cm$ |
| 2. Area | The amount of **space** **inside** a shape.Units include: $mm^{2}, cm^{2}, m^{2}$ | Image result for area |
| 3. Area of a Rectangle | **Length x Width** |  $A=36cm^{2}$ |
| 4. Area of a Parallelogram | **Base x Perpendicular Height**Not the slant height. | Image result for area of parallelogram$A=21cm^{2}$ |
| 5. Area of a Triangle | **Base x Height ÷ 2** | Image result for area of triangle$A=24cm^{2}$ |
| 6. Area of a Kite | Split in to **two triangles** and use the method above. | Image result for area of kite $A=8.8m^{2}$ |
| 7. Area of a Trapezium | $$\frac{(a+b)}{2}×h$$“Half the sum of the parallel side, times the height between them. That is how you calculate the area of a trapezium” | Image result for area of trapezium $A=55cm^{2}$ |
| 8. Compound Shape | A shape made up of a **combination of other known shapes** put together. |  |

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| **Topic/Skill**  | **Definition/Tips** | **Example****Topic: Volume**  |
| 1. Volume | Volume is a measure of the amount of space inside a solid shape.Units: $mm^{3}, cm^{3},m^{3}$ etc. | Image result for math definition volume |
| 2. Volume of a Cube/Cuboid | $$V=Length×Width×Height$$$$V=L×W×H$$You can also use the Volume of a Prism formula for a cube/cuboid. | Image result for volume cuboid |
| 3. Prism | A prism is a 3D shape whose **cross section is the same** throughout. | Image result for math definition prism |
| 4. Cross Section | The **cross section** is the **shape** that **continues** all the way **through the prism**. |  |
| 5. Volume of a Prism | $$V= Area of Cross Section×Length$$$$V=A×L$$ |  |
| 6. Volume of a Cylinder | $$V=πr^{2}h$$ |  |
| 7. Volume of a Cone | $$V=\frac{1}{3}πr^{2}h$$ |  |
| 8. Volume of a Pyramid | $$Volume= \frac{1}{3}Bh$$where B = area of the base | $$V=\frac{1}{3}×6×6×7=84cm^{3}$$ |
| 9. Volume of a Sphere | $$V=\frac{4}{3}πr^{3}$$Look out for hemispheres – just halve the volume of a sphere. | Find the volume of a sphere with diameter 10cm.$$V=\frac{4}{3}π(5)^{3}=\frac{500π}{3}cm^{3}$$ |
| 10. Frustums | A frustum is a solid (usually a cone or pyramid) with the **top removed**.Find the volume of the whole shape, then take away the volume of the small cone/pyramid removed at the top. | **Topic: Geometry and Measures (H)** $$V=\frac{1}{3}π\left(10\right)^{2}\left(24\right)-\frac{1}{3}π\left(5\right)^{2}\left(12\right)=700πcm^{3}$$ |

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| **Topic/Skill**  | **Definition/Tips** | **Example****Topic: Circumference and Area**  |
| 1. Circle | A circle is the locus of all points equidistant from a central point. | Image result for math definition circle |
| 2. Parts of a Circle | **Radius** – the **distance** from the **centre** of a circle to the **edge****Diameter** – the total **distance** across the **width** of a circle **through the centre**.**Circumference** – the **total distance** around the **outside** of a circle**Chord** – a **straight line** whose **end points lie on a circle****Tangent** – a **straight line** which **touches** a circle at exactly **one point****Arc** – a **part of the circumference** of a circle**Sector** – the **region** of a circle enclosed by **two radii** and their intercepted **arc****Segment** – the **region** bounded by a **chord** and the **arc** created by the chord | Image result for parts of a circle |
| 3. Area of a Circle | $A=πr^{2}$ which means ‘pi x radius squared’. | If the radius was 5cm, then:$$A=π×5^{2}=78.5cm^{2}$$ |
| 4. Circumference of a Circle | $C=πd$ which means ‘pi x diameter’ | If the radius was 5cm, then:$$C=π×10=31.4cm$$ |
| 5. $π$ (‘pi’) | Pi is the circumference of a circle divided by the diameter.$$π≈3.14$$ |  |
| 6. Arc Length of a Sector | The arc length is part of the circumference.Take the **angle** given **as a fraction over 360°** and **multiply** by the **circumference**. | Arc Length = $\frac{115}{360}×π×8=8.03cm$ |
| 7. Area of a Sector | The area of a sector is part of the total area.Take the **angle** given **as a fraction over 360°** and **multiply** by the **area**. | Area = $\frac{115}{360}×π×4^{2}=16.1cm^{2}$ |
| 8. Surface Area of a Cylinder | **Curved Surface Area =** $πdh$ or $2πrh$**Total SA =** $2πr^{2}+πdh$or$2πr^{2}+2πrh$ | $$Total SA=2π(2)^{2}+π\left(4\right)\left(5\right)=28π$$ |
| 9. Surface Area of a Cone | **Curved Surface Area =** $πrl$ where $l=slant height$**Total SA =** $πrl+ πr^{2}$You may need to use Pythagoras’ Theorem to find the slant height | $$Total SA= π\left(3\right)\left(5\right)+π(3)^{2}=24π$$ |
| 10. Surface Area of a Sphere | $$SA=4πr^{2}$$Look out for hemispheres – halve the SA of a sphere and add on a circle $(πr^{2})$ | Find the surface area of a sphere with radius 3cm.$$SA=4π(3)^{2}=36πcm^{2}$$ |

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| **Topic/Skill**  | **Definition/Tips** | **Example****Topic: Accuracy**  |
| 1. Place Value | The **value** of where a **digit** is within a number. | In 726, the value of the 2 is 20, as it is in the ‘tens’ column. |
| 2. Place Value Columns | The names of the columns that **determine the value of each digit**.The ‘ones’ column is also known as the ‘units’ column. | Image result for place value columns |
| 3. Rounding | To make a number simpler but keep its value close to what it was.If the **digit to the right** of the rounding digit is **less than 5, round down**. If the **digit to the right** of the rounding digit is **5 or more, round up**. | 74 rounded to the nearest ten is 70, because 74 is closer to 70 than 80.152,879 rounded to the nearest thousand is 153,000.  |
| 4. Decimal Place | The **position** of a digit to the **right of a decimal point**. | In the number 0.372, the 7 is in the second decimal place.0.372 rounded to two decimal places is 0.37, because the 2 tells us to round down.Careful with money - don’t write £27.4, instead write £27.40 |
| 5. Significant Figure | The significant figures of a number are the digits which **carry meaning** (ie. are significant) to the size of the number.The **first significant figure** of a number **cannot be zero**.In a number with a decimal, trailing zeros are not significant. | In the number 0.00821, the first significant figure is the 8.In the number 2.740, the 0 is not a significant figure.0.00821 rounded to 2 significant figures is 0.0082.19357 rounded to 3 significant figures is 19400. We need to include the two zeros at the end to keep the digits in the same place value columns. |
| 6. Truncation | A method of approximating a decimal number by **dropping all decimal places** past a certain point **without rounding**. | 3.14159265… can be truncated to 3.1415 (note that if it had been rounded, it would become 3.1416) |
| 7. Error Interval | A **range of values** that a number could have taken before being rounded or truncated.An error interval is written using inequalities, with a **lower bound** and an **upper bound**.Note that the lower bound inequality can be ‘equal to’, but the upper bound cannot be ‘equal to’. | 0.6 has been rounded to 1 decimal place. The error interval is:$$0.55\leq x<0.65$$The lower bound is 0.55The upper bound is 0.65 |
| 8. Estimate | To find something **close to the correct answer**. | An estimate for the height of a man is 1.8 metres. |
| 9. Approximation | When using approximations to estimate the solution to a calculation, **round each number in the calculation to 1 significant figure**.$≈ $means ‘approximately equal to’ | $$\frac{348+692}{0.526}≈\frac{300+700}{0.5}=2000$$‘Note that dividing by 0.5 is the same as multiplying by 2’ |
| 10. Rational Number | A number of the form $\frac{p}{q}$**,** where $p$ **and** $q$ **are integers** and $q\ne 0.$A number that cannot be written in this form is called an ‘irrational’ number | $\frac{4}{9}, 6, -\frac{1}{3}, \sqrt{25}$ are examples of rational numbers.$π, \sqrt{2}$ are examples of an irrational numbers. |
| 11. Surd | The **irrational number** that is a **root of a positive integer,** whose value cannot be determined exactly.Surds have **infinite non-recurring decimals**. | $\sqrt{2}$ is a surd because it is a root which cannot be determined exactly.$\sqrt{2}=1.41421356…$ which never repeats. |
| 12. Rules of Surds | $$\sqrt{ab}=\sqrt{a}×\sqrt{b}$$$$\sqrt{\frac{a}{b}}=\frac{\sqrt{a}}{\sqrt{b}}$$$$a\sqrt{c}\pm b\sqrt{c}=\left(a\pm b\right)\sqrt{c}$$$$\sqrt{a}×\sqrt{a}=a$$ | $$\sqrt{48}=\sqrt{16}×\sqrt{3}=4\sqrt{3}$$$$\sqrt{\frac{25}{36}}=\frac{\sqrt{25}}{\sqrt{36}}=\frac{5}{6}$$$$2\sqrt{5}+7\sqrt{5}=9\sqrt{5}$$$$\sqrt{7}×\sqrt{7}=7$$ |
| 13. Rationalise a Denominator | The process of rewriting a fraction so that the **denominator contains only rational numbers**. | $$\frac{\sqrt{3}}{\sqrt{2}}=\frac{\sqrt{3}×\sqrt{2}}{\sqrt{2}×\sqrt{2}}=\frac{\sqrt{6}}{2}$$$$\frac{6}{3+\sqrt{7}}=\frac{6\left(3-\sqrt{7}\right)}{\left(3+\sqrt{7}\right)\left(3-\sqrt{7}\right)}=\frac{18-6\sqrt{7}}{9-7}=\frac{18-6\sqrt{7}}{2}=9-3\sqrt{7}$$ |

**Knowledge Organiser**