Year 8 Autumn 1

Unit 1 Number

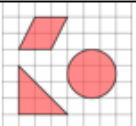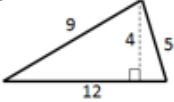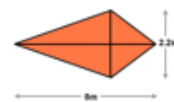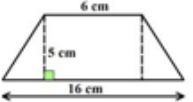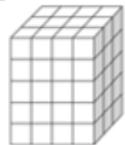| Topic/Skill	Definition/Tips	Example
1. Integer	A **whole number** that can be positive, negative or zero.	$-3, 0, 92$
2. Decimal	A number with a **decimal point** in it. Can be positive or negative.	$3.7, 0.94, -24.07$
3. Negative Number	A number that is **less than zero**. Can be decimals.	$-8, -2.5$
4. Addition	To find the **total**, or **sum**, of two or more numbers. 'add', 'plus', 'sum'	$3 + 2 + 7 = 12$
5. Subtraction	To find the **difference** between two numbers. To find out how many are left when some are taken away. 'minus', 'take away', 'subtract'	$10 - 3 = 7$
6. Multiplication	Can be thought of as **repeated addition**. 'multiply', 'times', 'product'	$3 \times 6 = 6 + 6 + 6 = 18$
7. Division	Splitting into equal parts or groups. The process of calculating the **number of times one number is contained within another one**. 'divide', 'share'	$20 \div 4 = 5$ $\frac{20}{4} = 5$
8. Remainder	The amount '**left over**' after dividing one integer by another.	The remainder of $20 \div 6$ is 2, because 6 divides into 20 exactly 3 times, with 2 left over.
9. Multiple	The result of multiplying a number by an integer. The **times tables** of a number.	The first five multiples of 7 are: $7, 14, 21, 28, 35$
10. Factor	A number that **divides exactly** into another number without a remainder. It is useful to write factors in pairs	The factors of 18 are: $1, 2, 3, 6, 9, 18$ The factor pairs of 18 are: $1, 18$ $2, 9$ $3, 6$
11. Prime Number	A number with **exactly two factors**. A number that can only be divided by itself and one. The number **1 is not prime**, as it only has one factor, not two.	The first ten prime numbers are: $2, 3, 5, 7, 11, 13, 17, 19, 23, 29$

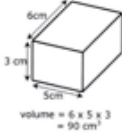|		
12. Prime Factor	A factor which is a prime number.	The prime factors of 18 are: 2, 3
13. Product of Prime Factors	Finding out which **prime numbers** **multiply** together to make the **original** number. Use a **prime factor tree**. Also known as 'prime factorisation'.	
14. Square Number	The number you get when you **multiply a number by itself.**	1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225… $9^2 = 9 \times 9 = 81$
15. Square Root	The **number you multiply by itself** to get another number. The reverse process of squaring a number.	$\sqrt{36} = 6$ because $6 \times 6 = 36$
16. Solutions to $x^2 = ...$	**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 $x = \pm 5$
17. Cube Number	The number you get when you **multiply a number by itself and itself again.**	1, 8, 27, 64, 125… $2^3 = 2 \times 2 \times 2 = 8$
18. 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 $5 \times 5 \times 5 = 125$
19. 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.

Try these

1 Work out
   a 14.7 + 2.63 − 1.5
   b 37.3 × 20
   c Find the cost of 3 shirts costing £8.99 each.
2 The temperature in a freezer should be −12°C.
   a During a power cut, the temperature in Bill's freezer went up by 15°C. What was the new temperature?
   b The temperature in Ahad's new freezer is 20°C. When he switched on the freezer, the temperature fell by 2°C per hour.
      How many hours did it take for the freezer to reach the correct temperature?
5 a Between which two whole numbers does $\sqrt{57}$ lie?
   b Between which two whole numbers does $\sqrt[3]{100}$ lie?
6 Bill changes his torch battery every 55 days. Asfa changes her supertorch battery every 30 days. One morning they both put new batteries in their torches. Use prime factors to find when they would next both change their batteries together, assuming they used their torches at the same rate.
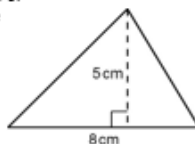9 Work out the difference between 6^3 and 14^2

Year 8 Autumn 1

Unit 2 Area and Volume

Topic/Skill	Definition/Tips	Example
1. Area	The amount of **space inside** a shape. Units include: mm^2, cm^2, m^2	
2. Area of a Rectangle	**Length x Width**	9 cm 4 cm $A = 36cm^2$
3. Area of a Parallelogram	**Base x Perpendicular Height** Not the slant height.	4cm · 3cm 7cm $A = 21cm^2$
4. Area of a Triangle	**Base x Height ÷ 2**	9 · 4 · 5 12 $A = 24cm^2$
5. Area of a Kite	Split in to **two triangles** and use the method above.	2.2m 8m $A = 8.8m^2$
6. Area of a Trapezium	$\dfrac{(a+b)}{2} \times h$ "Half the sum of the parallel side, times the height between them. That is how you calculate the area of a trapezium"	6 cm 5 cm 16 cm $A = 55cm^2$
7. Compound Shape	A shape made up of a **combination of other known shapes** put together.	
8. Volume	Volume is a measure of the amount of space inside a solid shape. Units: mm^3, cm^3, m^3 etc.	

9. Volume of a Cube/Cuboid	$V = Length \times Width \times Height$ $V = L \times W \times H$ You can also use the Volume of a Prism formula for a cube/cuboid.	 volume = 6 x 5 x 3 = 90 cm³
10. Prism	A prism is a 3D shape whose **cross section** is **the same** throughout.	
11. Cross Section	The **cross section** is the **shape** that **continues** all the way **through the prism**.	
12. Volume of a Prism	$V = Area\ of\ Cross\ Section \times Length$ $V = A \times L$	

Try these

1 Find the area of
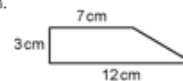 a the triangle   b the parallelogram

  5cm
  8cm

  3.5cm   4cm
  7cm

2   The measurements of this polygon are given in cm.

  a   Write the name of the shape.
  c   Work out its area using the formula for this shape.

  7cm
  3cm
  12cm

3   The measurements of this cuboid are given in cm.

  2cm
  7.8cm
  14.2cm

  Find the volume of this shape. Make sure to include the units in your answer.

4   Complete the missing measurements.
  a   3 m = ... cm
  b   8500 ml = ... litres
  c   4 tonnes = ... kg
  d   2.4 litres = ... cm³

5   The volume of a cube is 64 cm³. Find the length of its edge.
8   a   Find the surface area of the cuboid

  1cm   2cm
  3cm