

# YEAR 7 MATHS KNOWLEDGE ORGANISER

Topic/Skill	Definition/Tips	Example
1. Expression	A mathematical statement written using <b>symbols, numbers</b> or <b>letters</b> ,	$3x + 2$ or $5y^2$
2. Equation	A statement showing that <b>two expressions are equal</b>	$2y - 17 = 15$
3. Identity	An equation that is <b>true for all values</b> of the variables  An identity uses the symbol: $\equiv$	$2x \equiv x+x$
4. Formula	Shows the <b>relationship</b> between <b>two or more variables</b>	Area of a rectangle = length x width or $A = L \times W$
5. Simplifying Expressions	<b>Collect 'like terms'</b> .  Be careful with negatives. $x^2$ and $x$ are not like terms.	$2x + 3y + 4x - 5y + 3 = 6x - 2y + 3$ $3x + 4 - x^2 + 2x - 1 = 5x - x^2 + 3$
6. $x$ times $x$	The answer is $x^2$ not $2x$ .	Squaring is multiplying by itself, not by 2.
7. $p \times p \times p$	The answer is $p^3$ not $3p$	If $p=2$ , then $p^3=2 \times 2 \times 2=8$ , not $2 \times 3=6$
8. $p + p + p$	The answer is $3p$ not $p^3$	If $p=2$ , then $2+2+2=6$ , not $2^3 = 8$
9. Expand	To expand a bracket, <b>multiply</b> each term <b>in the bracket</b> by the expression <b>outside</b> the bracket.	$3(m + 7) = 3m + 21$
10. Factorise	The <b>reverse</b> of <b>expanding</b> . Factorising is writing an expression as a product of terms by <b>'taking out' a common factor</b> .	$6x - 15 = 3(2x - 5)$ , where 3 is the common factor.

## The mean

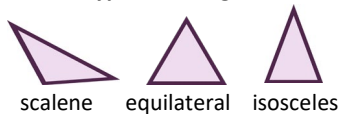
The mean is a type of average. To find the mean, add up all the numbers and divide by how many there are. E.g. the mean of 4, 5, 3, 4 is 4. (Because  $4 + 5 + 3 + 4 = 16$ , and  $16 \div 4 = 4$ )

## 2D shapes

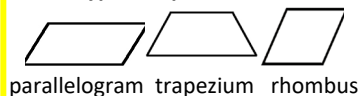
Name	No. of sides
quadrilateral	4
pentagon	5
hexagon	6
heptagon	7
octagon	8
nonagon	9
decagon	10

polygon = shape with straight sides  
 regular = all sides/angles the same  
 irregular = sides/angles **not** same

### Types of triangle



### Types of quadrilateral



### AREA

is the amount of space inside a 2D shape usually measured in  $\text{cm}^2$  or  $\text{m}^2$ .

#### Area of a triangle

$$= (\text{base} \times \text{height}) \div 2$$

#### Area of a parallelogram

$$= \text{base} \times \text{height}$$

(Height = perpendicular height)

## Multiplication and division vocabulary

Term	Definition	Example
factor	a number that divides exactly into another number	factors of 12 = 1, 2, 3, 4, 6, 12
common factor	factors of two numbers that are the same	common factors of 8 and 12 = 1, 2, 4
prime number	a number with only 2 factors: 1 and itself	2, 3, 5, 7, 11, 13, 17, 19...
composite number	a number with more than two factors	12 (it has 6 factors)
prime factor	a factor that is prime	prime factors of 12 = 2, 3
multiple	a number in another number's times table	multiples of 9 = 9, 18, 27, 36...
common multiple	multiples of two numbers that are the same	common multiples of 4 and 6 = 12, 24...
square numbers	the result when a number has been multiplied by itself	25 ( $5^2 = 5 \times 5$ ) 49 ( $7^2 = 7 \times 7$ )
cube numbers	the result when a number has been multiplied by itself 3 times	8 ( $2^3 = 2 \times 2 \times 2$ ) 27 ( $3^3 = 3 \times 3 \times 3$ )

## Angles

full turn	$360^\circ$
half turn	$180^\circ$
right angle	$90^\circ$
acute angle	$< 90^\circ$
obtuse angle	$> 90^\circ$
reflex angle	$> 180^\circ$
angles on a straight line	$180^\circ$
angles inside a triangle	$180^\circ$
angles inside a quadrilateral	$360^\circ$

## Fractions, decimals & percentages

$\frac{1}{100}$	0.01	1%	$\div 100$
$\frac{1}{20}$	0.05	5%	$\div 20$
$\frac{1}{10}$	0.1	10%	$\div 10$
$\frac{1}{5}$	0.2	20%	$\div 5$
$\frac{1}{4}$	0.25	25%	$\div 4$
$\frac{1}{2}$	0.5	50%	$\div 2$
$\frac{3}{4}$	0.75	75%	$\div 4, \times 3$
1	1	100%	$\div 1$

## Bar Charts

Represents data as vertical blocks.  
 $x$  - **axis** shows the type of data  
 $y$  - **axis** shows the frequency for each type of data  
 Each bar should be the **same width**  
 There should be **gaps** between each bar  
 Remember to **label** each axis.

