KLA Year 10 FOUNDATION
Term 1 Maths Knowledge Organisers

Year 10 – Foundation Knowledge Organiser Half Term 1

Key Topics and Vocabulary

Standard Form

Standard Form

Multiplying or Dividing with Standard Form

Adding or Subtracting with Standard Form

Pythagoras' theorem

Pythagoras' Theorem

Trigonometry

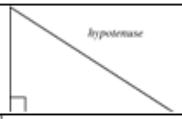
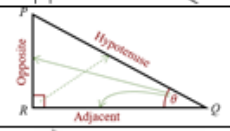
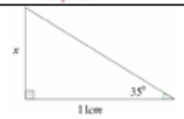
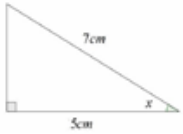
Exact Values for Angles in Trigonometry

Trigonometry

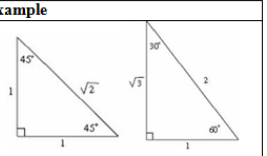
Hypotenuse

Adjacent

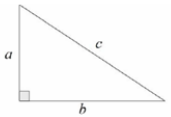
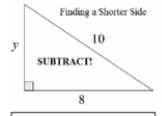
Trigonometric Formulae

Topic/Skill	Definition/Tips	Example
1. Trigonometry	The **study** of **triangles**.	
2. Hypotenuse	The **longest side** of a **right-angled triangle**. Is always **opposite** the **right angle**.	
3. Adjacent	**Next to**	
4. Trigonometric Formulae	Use **SOHCAHTOA**. $\sin\theta = \frac{O}{H}$ $\cos\theta = \frac{A}{H}$ $\tan\theta = \frac{O}{A}$  When finding a missing angle, use the 'inverse' trigonometric function by pressing the 'shift' button on the calculator.	 Use 'Opposite' and 'Adjacent', so use 'tan' $\tan 35 = \frac{x}{11}$ $x = 11\tan 35 = 7.70cm$  Use 'Adjacent' and 'Hypotenuse', so use 'cos' $\cos x = \frac{5}{7}$ $x = \cos^{-1}\left(\frac{5}{7}\right) = 44.4°$

Topic/Skill	Definition/Tips	Example
1. Standard Form	$A \times 10^b$ $where\ 1 \leq A < 10, \quad b = integer$	$8400 = 8.4 \times 10^3$ $0.00036 = 3.6 \times 10^{-4}$
2. Multiplying or Dividing with Standard Form	Multiply: **Multiply the numbers** and **add the powers**. Divide: **Divide the numbers** and **subtract the powers**.	$(1.2 \times 10^3) \times (4 \times 10^6) = 8.8 \times 10^9$ $(4.5 \times 10^5) \div (3 \times 10^2) = 1.5 \times 10^3$
3. Adding or Subtracting with Standard Form	**Convert** in to **ordinary** numbers, **calculate** and then **convert back** in to standard form	$2.7 \times 10^4 + 4.6 \times 10^3$ $= 27000 + 4600 = 31600$ $= 3.16 \times 10^4$

Topic/Skill	Definition/Tips	Example
1. Exact Values for Angles in Trigonometry		

	0°	30°	45°	60°	90°
sin	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1
cos	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0
tan	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	----

Topic/Skill	Definition/Tips	Example
1. Pythagoras' Theorem	For any **right angled triangle**: $a^2 + b^2 = c^2$  Used to find **missing lengths**. a and b are the shorter sides, c is the **hypotenuse** (**longest side**).	 $a = y,\ b = 8,\ c = 10$ $a^2 = c^2 - b^2$ $y^2 = 100 - 64$ $y^2 = 36$ $y = 6$

Year 10 – Foundation Knowledge Organiser Half Term 2

Key Vocabulary

Algebra quadratics, rearranging formulae and indentities

Quadratic

Factorising Quadratics

Difference of Two Squares

Solving Quadratics $(ax^2 = b)$

Solving Quadratics $(ax^2 + bx = 0)$

Solving Quadratics by Factorising

$(a = 1)$

Factorising Quadratics when $a \neq 1$

Solving Quadratics by Factorising

$(a \neq 1)$

Collecting and Representing Data

Frequency Table

Bar Chart

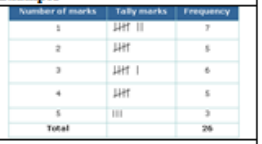
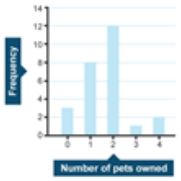
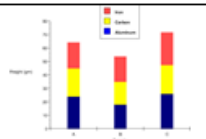
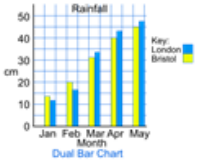
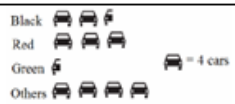
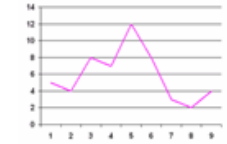
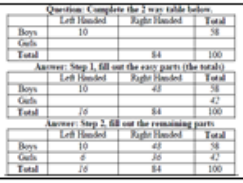
Types of Bar Chart

Pie Chart

Pictogram

Line Graph

Two Way Tables

Topic/Skill	Definition/Tips	Example
1. Frequency Table	A record of **how often each value** in a set of data **occurs**.	
2. Bar Chart	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.	
3. Types of Bar Chart	**Compound/Composite** Bar Charts show data stacked on top of each other. **Comparative/Dual** Bar Charts show data side by side.	 
4. Pie Chart	Used for showing **how data breaks down into** its constituent **parts**. When drawing a pie chart, **divide 360° by the total frequency**. This will tell you how many degrees to use for the frequency of each category. Remember to **label** the category that each sector in the pie chart represents.	 If there are 40 people in a survey, then each person will be worth 360÷40=9° of the pie chart.
5. Pictogram	Uses **pictures** or symbols to **show the value** of the data. A pictogram must have a **key**.	
6. Line Graph	A graph that uses **points connected by straight lines** to show how data changes in values. This can be used for **time series data**, which is a series of data points spaced over uniform time intervals in **time order**.	
7. Two Way Tables	A table that **organises data** around **two categories**. Fill out the information step by step using the information given. Make sure all the totals add up for all columns and rows.	

Topic/Skill	Definition/Tips	Example
1. Quadratic	A quadratic expression is of the form $ax^2 + bx + c$ where a, b and c are numbers, $a \neq 0$	Examples of quadratic expressions: x^2 $8x^2 - 3x + 7$ Examples of non-quadratic expressions: $2x^3 - 5x^2$ $9x - 1$
2. Factorising Quadratics	When a quadratic expression is in the form $x^2 + bx + c$ find the two numbers that **add to give b** and **multiply to give c**.	$x^2 + 7x + 10 = (x + 5)(x + 2)$ (because 5 and 2 add to give 7 and multiply to give 10) $x^2 + 2x - 8 = (x + 4)(x - 2)$ (because +4 and -2 add to give +2 and multiply to give -8)
3. Difference of Two Squares	An expression of the form $a^2 - b^2$ can be factorised to give $(a + b)(a - b)$	$x^2 - 25 = (x + 5)(x - 5)$ $16x^2 - 81 = (4x + 9)(4x - 9)$
4. Solving Quadratics $(ax^2 = b)$	Isolate the x^2 term and square root both sides. Remember there will be a **positive and a negative solution**.	$2x^2 = 98$ $x^2 = 49$ $x = \pm 7$
5. Solving Quadratics $(ax^2 + bx = 0)$	**Factorise** and then **solve = 0**.	$x^2 - 3x = 0$ $x(x - 3) = 0$ $x = 0$ *or* $x = 3$

Year 10 - Foundation

Maths

Knowledge Questions

Below are a series of questions.

Use these to apply your knowledge and practice.

Circumference and area

Is the diameter of a circle also a chord? Why or why not?
What's the difference between a segment and a sector?

Basic trigonometry

Will the ratio remain constant if the given angle gets bigger/smaller? Why/Why not?

Basic Algebra

What does the word solve mean? What connection does this have to the word solution?

Algebra quadratics, rearranging formula and identities

Which letter is the subject of the formula? How do you know?

Collecting and representing data

Why do statisticians take samples rather than interview the whole population?

Year 10 - Foundation

Maths

Knowledge Checklist

	KNOWLEDGE CHECKLIST	KNOWLEDGE PROGRESS R	A	G
1	Circumference and area			
2	Basic trigonometry			
3	Basic algebra			
4	Algebra quadratics, rearranging formula and identities			
5	Collecting and representing data			
6				
7				
8				
9				
10				

High Flyers - Enrichment Task

Use the information on the first triangle to find the missing values x on the following two triangles.