St Ninian's High School

Mathematics Department Curriculum for Excellence

National 4 (2)

Pupil Learning Log

- **I understand this part of the course =** 
- **I am unsure of this part of the course =** 
- **I do not understand this part of the course =** 

Name_____ Class____ Teacher_____

Pupil Learning Log

Topic 1 - Integers (Chapter 1)

1		
2		
3		
4		
5		

1. **Understand** – concept of +ve and –ve numbers

2. **Simple up and down**
using thermometer

3. **Use thermometer**

to add / sub integers mentally

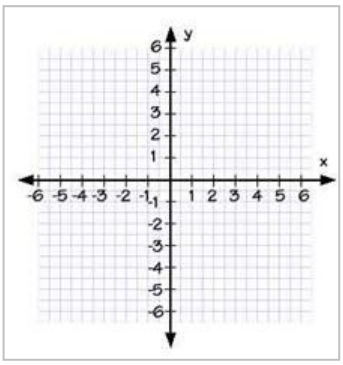
4. **Rules for multiplying / dividing**

Different signs = negative answer

Same signs = positive answer

5. **Coordinate Grid /(4 Quadrants)**

e.g. (1,1) ,
(-2,3),
(-4,-5),
(6,-2)



Pupil comment _____

Pupil Learning Log

Topic 2 – Proportion (Chapter 2)

1		
2		
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4		

1. **Rates**

l £

$5 \rightarrow £100$

$1 \rightarrow \frac{1}{5} \times 100 = £20$

2. **Direct Proportion**

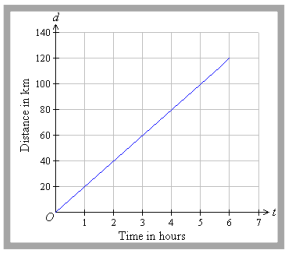
Textbooks £

$5 \rightarrow £400$

$4 \rightarrow \frac{4}{5} \times 400 = £320$

3. **Linear Graphs of Direct Proportion**

$y = kx$



4. **Inverse Proportion**

Building a house

Men *Months*

$10 \rightarrow 12$

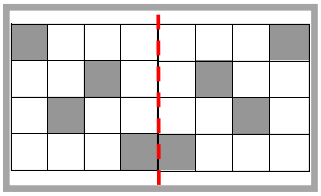
$8 \rightarrow \frac{10}{8} \times 12 = 15$

Pupil comment _____

Pupil Learning Log

Topic 3 – Symmetry (Chapter 3)

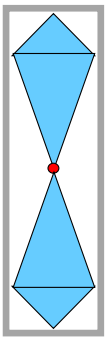
1. **Line / Reflection**
   Mirror image



2. **Rotational / Turn**

   Half turn, quarter turn etc.....

   Order of rotation 1, 2, 3, 4 etc...



3. **Creating Turn Symmetry**

1		
2		
3		

Pupil comment _____

Pupil Learning Log

Topic 4 – Scientific Notation (Chapter 4)

1		
2		
3		

1. **Large Numbers – scientific notation**

$$456000 = 4.56 \times 10^{5}$$

2. **Scientific Notation to normal form**

$$2.3 \times 10^{3} \rightarrow 2300$$

3. **Small numbers – scientific notation and vice-versa**

$$0.00743 = 7.43 \times 10^{-3}$$

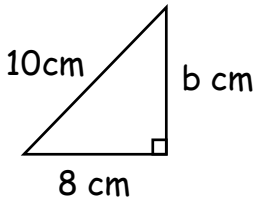
$$1.25 \times 10^{-4} = 0.000125$$

Pupil comment _____

Topic 5 – Pythagoras Theorem **REVISITED** (Chapter 5)

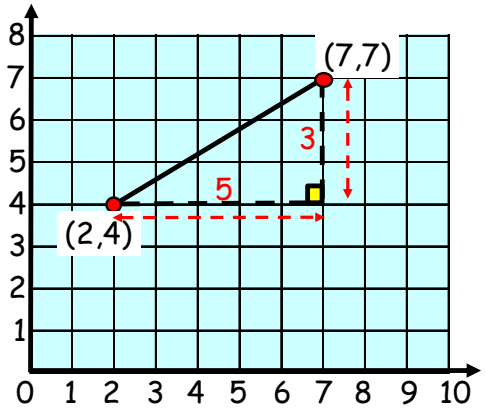
1		
2		
3		

1. Finding smaller side



$$(smaller\ side)^2 = (Hypotenuse)^2 - (other\ smaller\ side)^2$$

2. Distance between two points



$$c^2 = a^2 + b^2$$

$$c^2 = 5^2 + 3^2$$

$$c = \sqrt{25+9}$$

$$c = \sqrt{34}$$

$$c = 5.83$$

3. Mixed questions

$$(Hypotenuse)^2 = (smaller\ side)^2 + (other\ smaller\ side)^2$$

Pupil comment _____

Pupil Learning Log

Topic 6 – Straight Line (Chapter 6)

1		
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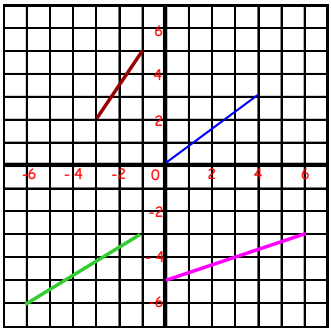
1. Gradient

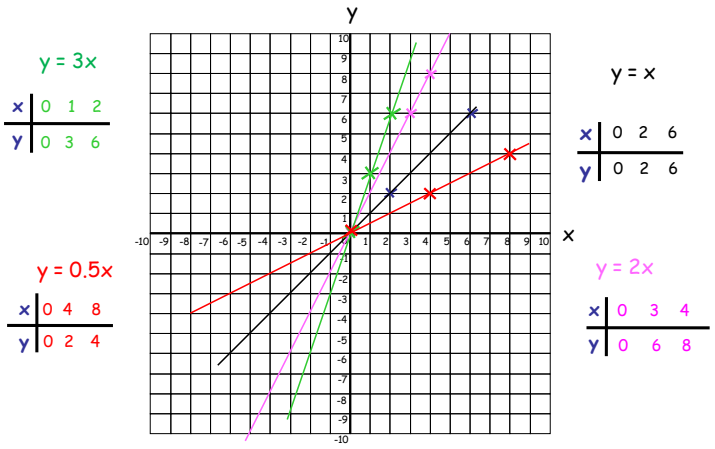
The Gradient Is the measure of how steep a slope is.

$$m = \frac{\text{Vertical Height}}{\text{Horizontal Distance}}$$



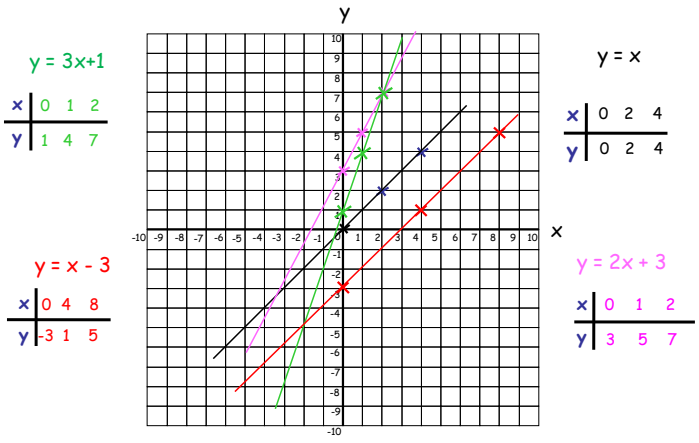
2. Basic Straight line Equation

$$y = mx$$



3. Straight line Equation

$$y = mx + c$$



Pupil comment _____

G4 Test (Topics 1 – 6)

For my G4 test I will
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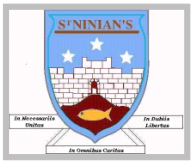
Pupil comment _____

Pupil Learning Log

Results of G4 Test



G4 - a Test (NON - Calculator)

Question	Topic	mark	I know this	Needs revision
1	Reading Negative Scales	/1		
2	Integers in Context	/1		
3	Basic Integer Calculations	/6		
4	Integers Calculations using BODMAS	/6		
5	Integers Coordinates	/5		
6	Tidying up Terms	/4		
7	Line Symmetry	/1		
8	Reflection Symmetry	/4		
9	Rotational Symmetry	/3		
10	Full number to Scientific Notation	/4		
11	Scientific Notation to Full number	/4		
12	Rounding	/2		
13a	Multiplying out brackets	/3		
13b	Solving Equations	/3		
	Total	/47		

G4 - b Test (Calculator)

Question	Topic	mark	I know this	Needs revision
1	Proportion	/2		
2	Proportion	/2		
3a	Pythagoras Theorem	/3		
3b	Pythagoras Theorem	/3		
4	Pythagoras Theorem in Context	/5		
5	Pythagoras Theorem in Context	/5		
6	Working out a Percentage in Context	/2		
7	Percentage Calculation in Context	/3		
8	Percentage & Money	/3		
	Total	**/28**		
	Overall Total	**/75**		

Next Steps

Pupil :

Guardians :

Pupil comment _____

Pupil Learning Log

Topic 7 – Surface Area (Chapter 7)

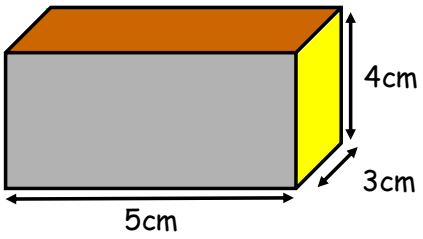
1		
2		
3		
4		

1. Revision of simple Areas

Square Rectangle Right-Angle Triangle

$A = l \times l$ $A = l \times b$ $A = \frac{1}{2}bh$

2. Surface Area of a Cuboid

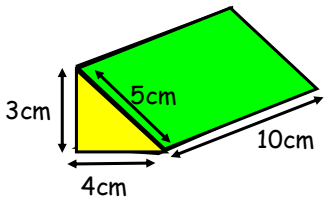


Front and back are the same

Top and bottom are the same

Right and left are the same

3. Surface Area of a Triangular Prism.



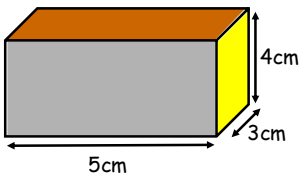
2 triangles the same

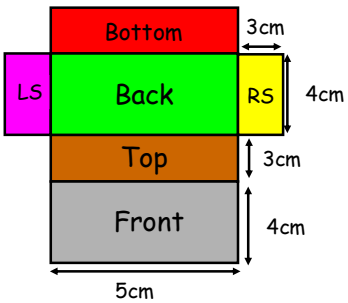
1 rectangle 3cm by 10cm

1 rectangle 4cm by 10cm

1 rectangle 5cm by 10cm

4. Nets of a solid (including Cube, Cuboid and Prisms)





Pupil comment _____

Pupil Learning Log

Topic 8 – Volume (Chapter 8)

1		
2		
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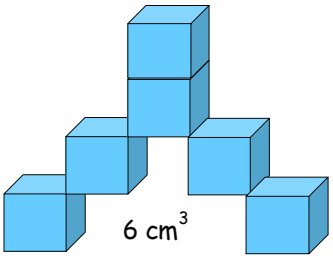
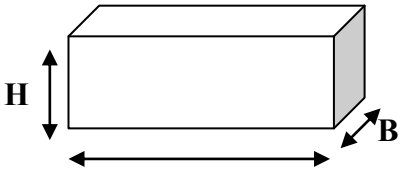
4		

1. **Counting Cubes for Volume**



2. **Volume Cuboid (including composite shapes)**



$$Volume = Length \times Breadth \times Height$$

3. **Liquid Volume**

1 litre = 1000 ml = 1000cm^3

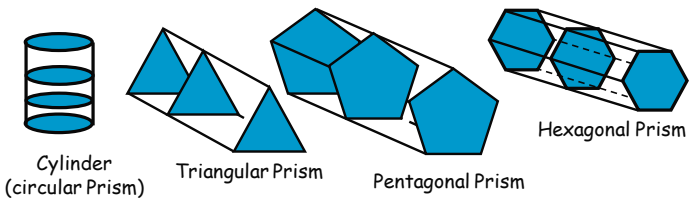
1ml = 1 cm^3

4. **Volume of Prisms**

$$Volume = Area \times Height$$

or

$$Volume = Area \times Length$$



Pupil comment _____

Pupil Learning Log

Topic 9 – Similarity Figures (Chapter 9)

1		
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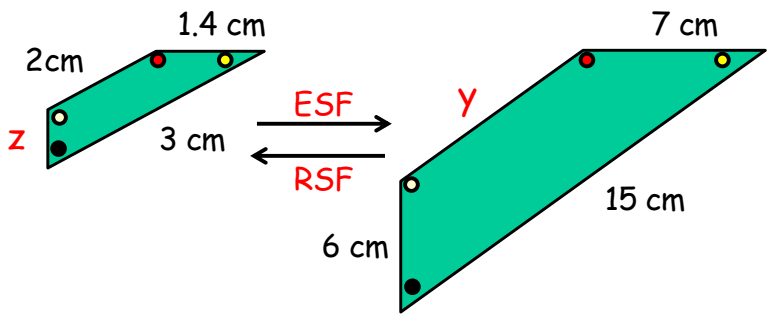
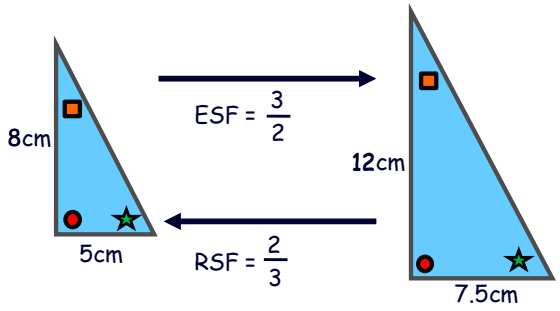
1. Similar Figures



Enlargement Scale Factor $ESF = \frac{15}{3} = 5$

Reduction Scale Factor $RSF = \frac{3}{15} = \frac{1}{5}$

2. Similar Triangles

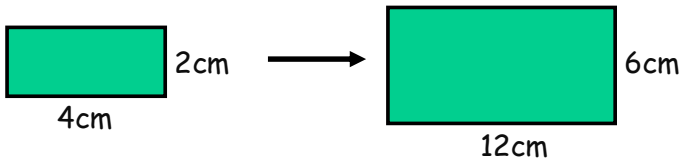


3. Area of Similar Figures.

$$Area_{large} = (ESF)^2 \times Area_{small}$$

OR

$$Area_{small} = (RSF)^2 \times Area_{large}$$



Small Area = $4 \times 2 = 8cm^2$

Large Area = $12 \times 6 = 72cm^2$

Scale factor = ESF = $\frac{12}{4} = 3$

Large Area = $(3)^2 \times 8 = 9 \times 8 = 72cm^2$

Pupil comment _____

Topic 10 – The Circle (Chapter 10)

1		
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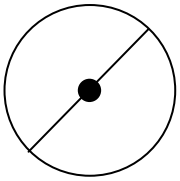
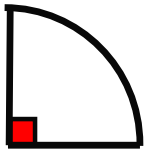
1. **Circumference of a Circle** (including composite)

$$C = \pi D$$

OR

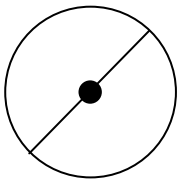
$$C = 2\pi r$$





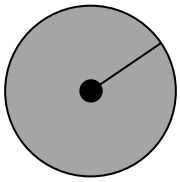
2. **Finding the Diameter of a Circle**

$$D = \frac{C}{\pi}$$

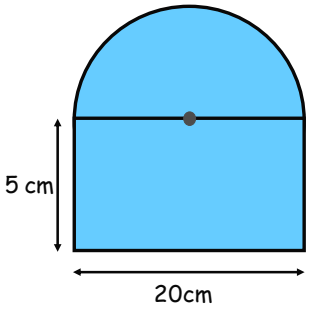


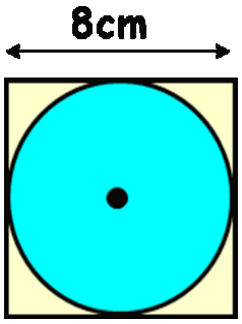
3. **Area of a Circle (**including composite)

$$A = \pi r^2$$



4. **Mixed Problems on Area and Perimeter**





Pupil comment _____

Pupil Learning Log

Topic 11 – Ratio (Chapter 11)

1		
2		
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4		

1. **Ratio** – used to compare different quantities

   2:3

2. **Simplifying Ratios** – (including Fractional Ratios)

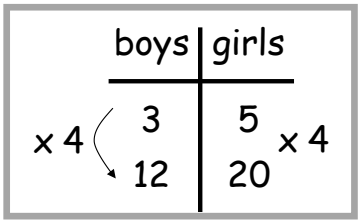
   $6:24$

   $1:4$

   $\frac{1}{2}:3$

   $1:6$

3. **Ratio Calculations**



4. **Ratio shares**

   Split £60 in ratio 2:3

   number of shares $2+3=5$

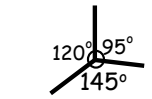
   $1 \text{ share} = 5\overline{)60}^{12}$ $\quad 2:3 \quad £24:£36$

Pupil comment _____

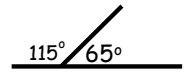
Topic 12 – Angles in a Circle (Chapter 12)

1		
2		
3		
4		

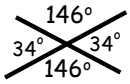
1. Revision of Angles.



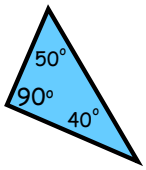
Angles round a point Add up to 360°



Two angles making a straight line add to 180°

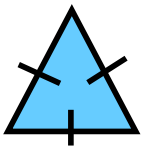


angles opposite each other at a cross are equal.

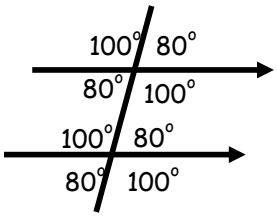


3 angles in a triangle ALWAYS add up to 180°.

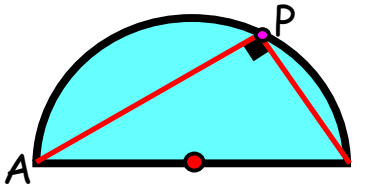
Two angles in an isosceles are equal



ALL angles in an equilateral triangle are 60°



2. Angle in a Semi-Circle



A triangle APB inscribed within a semicircle with hypotenuse equal to the diameter will ALWAYS be right angled at P on the circumference.

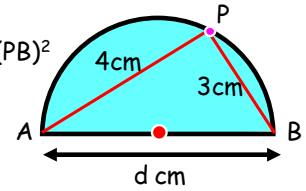
3. Pythagoras Theorem in a Semi-Circle.

$d^2 = (AP)^2 + (PB)^2$

$d^2 = 4^2 + 3^2$

$d^2 = 25$

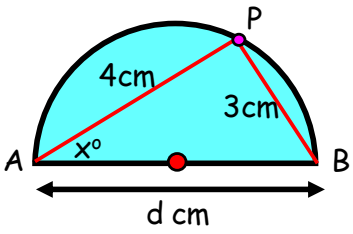
$d = 5$ cm



4. S^{O}H C^{A}H T^{O}A in a Semi-Circle.

$$\tan x^o = \frac{O}{A}$$

$$x^o = \tan^{-1}\left(\frac{3}{4}\right) = 36.9^o$$



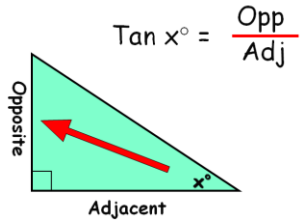
Pupil comment _____

Pupil Learning Log

Topic 13 – Trigonometry Revisited (Chapter 13)

1. **Tangent Ratio (Right-angled triangles ONLY)**

$$\tan x^o = \frac{Opp}{Adj}$$



Calculating the missing side.

Calculating the missing angle.

2. **Sine Ratio (Right-angled triangles ONLY)**

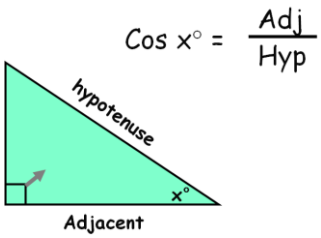
$$\sin x^o = \frac{Opp}{Hyp}$$

Calculating the missing side.

Calculating the missing angle.

3. **Cosine Ratio (Right-angled triangles ONLY)**

$$\cos x^o = \frac{Opp}{Hyp}$$



Calculating the missing side.

Calculating the missing angle.

4. **Mixed Problems ($S^OH\ C^AH\ T^OA$)**

1. Write down

2. Identify what you want to find

3. what you know

1		
2		
3		
4		

Pupil comment _____

Pupil Learning Log

Topic 14 – Formulae (Chapter 14)

1		
2		
3		

1. Working with Expressions (Substitution)

$a = 2 \quad b = -3 \qquad a^2 - b^2$

$= 2^2 - (-3)^2$

$= 4 - 9$

$= -5$

2. **Formulae expressed in Words**

Multiply the temperature in ^{o}C by 1.8 then add 32

3. Evaluating Formulae with Symbols

$V = \pi r^2 h \qquad F = ma \qquad y = 2x + 1$ etc.....

Pupil comment _____

Pupil Learning Log

Topic 15 – Factorising (Chapter 15)

1		
2		

1. Expanding - Brackets

$3(p + 7) = 3p + 21$

2. Factorising Expressions

$3y^2 – 6y = 3y(y – 2)$

Pupil comment _____

Pupil Learning Log

Topic 16 – Tolerance (Chapter 16)

1		
2		

1. **Tolerance**

   Values within certain limits.

   e.g.
   When a builder orders steel bolts to help to a house.
   He would like them to be 50 millimetres long **exactly**.
   This is not always possible so the builder allows a 'little error' either side of this.

2. **Tolerance Notation**

   Tolerance is written as (50±2)mm

   This means value can be between 48mm to 52mm

Pupil comment _____

Topic 17 – Variation (Chapter 17)

1		
2		

1. Proportion Revision

10 men build a house in 12 months.
How long will it take 8 men?

Men		*Months*
10	$\rightarrow$	12
8	$\rightarrow$	$\frac{10}{8}\times 12 = 15$ *months*

2. Variation - Direct

$If \quad C \alpha N$

then formula is

$C = kN$

e.g.

The number of dollars (d) varies directly as the number of £'s (P).
You get 3 dollars for £2.

Find a formula connecting d and P.

Since d is directly proportional to P the formula is of the form

$$d = kP$$
$$3 = k(2)$$
$$k = 3 \div 2 = 1.5$$

$$d = 1.5P$$

Pupil comment _____

Pupil Learning Log

My Achievements		
Skill	Activity	Date & Teacher Signature

Pupil comment _____

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Pupil comment _____