St Ninian's High School

MATHS
Higher Course
CHECKLIST

- I understand this part of the course =
- I am unsure of this part of the course =

Name_____Class_____Teacher_____
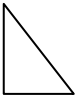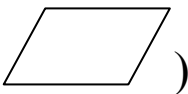
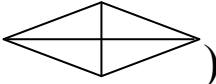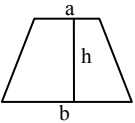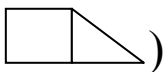- I do not understand this part of the course =

Chapter 1 - Area and Volume

1. Revision (Conversion litres - millilitres, Area of Rectangle / Square. Surface Area etc.)

2. The Area of a triangle. (A = $\frac{1}{2}b$ ase x height)

3. The Area of a Parallelogram (A = Base x Altitude)

4. The Rhombus and Kite (Area of a Kite = Half the product of the diagonals, A = $\frac{1}{2}d_1 \times d_2$)

5. The trapezium (A = $\frac{1}{2}h(a+b)$)

6. The Area of Composite Shapes (Split shape up into smaller shapes. Calculate individual areas and then add together.)

7. The Volume and Surface Area of a Prism. (Volume = Cross Section Area x Length or Height. Surface Area = Area of faces added together.)

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Chapter 2 - Money

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1. Money Calculations (£566.23 + £432.56 etc)

2. Wages and Salaries (Weekly wage = £200, How much does this person earn in a month? How much does this person earn in a year? £7 per hour, How much do you earn in one week if you work 30 hours etc)

3. Time Sheets and Overtime (Overtime – Time and a half, Double Time, time and a quarter.

4. Piecework and Commission (Piecework – Person gets paid £20 for one maths lesson, how much for 10 lessons? Commission – Sales person get 3% of the sales he makes. etc)

5. Payslips (Gross pay = Total amount earned before any deductions, Deductions = Tax, National Insurance, Pension, Net Pay = Total pay received after deductions)

6. National Insurance Contributions (This is a government tax on earnings, intended to contribute towards unemployment, ill health and retirement payments.)

7. Income Tax (Tax allowance = Amount of money the government is not allowed to tax. Tax is calculated by taking your annual salary and subtracting your allowance. This is the amount that will be taxed.

8. Bank and Building Society Accounts (Check book, cash card, credit card, bank statement.

9. Savings and Interest (Simple Interest eg £500 is deposited in a bank for 3 years. Work out interest gained for 1 year and multiply by 3. Compound Interest – The interest carries over onto the next year, thus building up in the bank account over the required term.)

10. Appreciation and Depreciation (Appreciation means an increase in value, Depreciation means a decrease in value. eg Appreciation – House is worth £120000 and in 3 years it is worth £145000, How much has it appreciated by? Depreciation – A Car is worth £6000, find out how much it has depreciated by in 3 years if the rate is 8%.)

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Chapter 3 – Similarity

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1. Representative Fractions (1cm Represents 10m, 1cm:1000cm or 1:1000)

2. Scale Drawings (Choose a suitable scale, Start all Movement points with a north line, Make sure all measurements are accurate.

3. Working out Scales (2cm : 5 km, therefore 2cm : 500000cm = 1 : 250000)

4. Similar Triangles
$$\left(\text{Enlargement Scale Factor} = \frac{L\arg e\_Measurement}{Small\_Measurement}\right)$$
$$\left(\text{Reduction Scale Factor} = \frac{Small\_Measurement}{L\arg e\_Measurement}\right)$$

5. Other Similar Triangles (The Corresponding Sides are
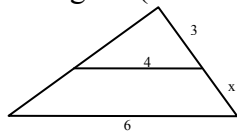
   in proportion)

6. Ratios of Areas (The scale factor for the area is the square of the scale factor for the length)

7. Surface Areas of similar solids (If two solids are similar, then the scale factor for the surface area is the square of the scale factor for the length)

8. Volumes of Similar Solids (The scale factor for volume is the cube of the scale factor for length)

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Chapter 4 – Formulae

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1. Review of BODMAS, removing brackets, Squaring numbers, substitution.(eg 2(x + 1) = 2x + 2, -3y = 33)

2. Using Formulae (Substituting various answers into formulae eg A = $\sqrt{\dfrac{hw}{3600}}$, where h = 1.8, w = 70kg)

3. Making Formulae (I buy a CD £m and Sell it for £n, making a profit £p. Formula would be P = n – m)

4. Change the subject of the Formula (A = πr^2 , Change subject to r, r = $\sqrt{\dfrac{A}{\pi}}$)

5. Understanding Formulae (C = π d, What happens if we double d?

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Chapter 5 - Equations and Inequations

1. Revision (Solving Equations, Foil, Lowest Common Multiple)		
2. Solving Harder Equations ($x^2 - 7 = (x-1)(x-2)$)		
3. Equations with fractions (Solve $\dfrac{y}{5} = \dfrac{1}{3}$)		
4. Inequalities ($\begin{array}{cc} \langle & \leq \\ \rangle & \geq \end{array}$)		
5. Solving Inequalities (Can you solve this Equation? $10m - 3 > 2x + 9$, Remember $\times / \div$ by a $-$ve number will flip the symbol round the opposite way.)		

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Chapter 6 – Algebraic Fractions

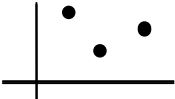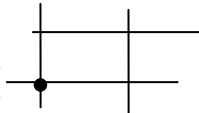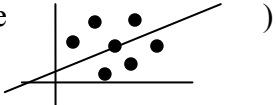|	👍	✊	👎
1. Revision of Fractions (Adding, Subtracting, Multiplying, Dividing Fractions)			
2. Equivalent Fractions (Find three fractions equivalent to $\dfrac{3}{5} = \dfrac{3x}{5x} = \dfrac{3(x+1)}{5(x+1)}$)			
3. Multiplying Fractions ($\dfrac{x}{y} \times \dfrac{3}{4} = \dfrac{3 \times x}{y \times 4} = \dfrac{3x}{4y}$)			
4. Dividing Fractions ($\dfrac{2}{3} \div \dfrac{3}{x} = \dfrac{2}{3} \times \dfrac{x}{3} = \dfrac{2 \times x}{3 \times 3} = \dfrac{2x}{9}$)			
5. Adding Fractions ($\dfrac{3}{4} + \dfrac{5}{7} = \dfrac{3 \times 7}{4 \times 7} + \dfrac{5 \times 4}{7 \times 4}$)			
6. Subtracting Fractions ($\dfrac{7}{8} - \dfrac{3}{7} = \dfrac{7 \times 7}{8 \times 7} - \dfrac{3 \times 8}{7 \times 8} = \dfrac{49}{56} - \dfrac{24}{56} = \dfrac{25}{56}$)			

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Chapter 7 – The Straight Line

1. Plotting Coordinates (   )

2. Naming Grid Lines (x = 4, y = 3 etc)

3. Gradient (Is the measure of how steep a slope is.

   $$M = \frac{Vertical\_Height}{Horizontal\_Dis\tan ce}$$

4. Gradients on a coordinate grid ($m = \dfrac{y_2 - y_1}{x_2 - x_1}$)

5. The Equation of a Line (y = mx + c, m = Gradient, c = y intercept)

6. The best fitting line (Scatter graph containing a best fitting line   )

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Chapter 8 - Quadratic Equations

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1. Revision (Solving Equations, Factorising, Difference of two squares, Quadratics)

2. Introducing Quadratic functions / Equations

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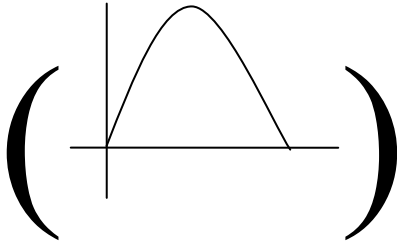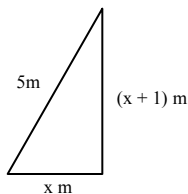
3. Using Factors to solve Quadratic Equations
   ($x^2 - 4x = 0$, x (x – 4) = 0, therefore the solutions are x = 0 and x = 4)

4. More Quadratic equations : Trinomials
   ($x^2 + 5x + 6 = 0$, (x + 3)(x + 2) = 0, (x + 3) = 0 , (x + 2) = 0, Therefore x = -3, x = -2

5. Manipulation ($(x + 4)^2 = 36$)

6. Problems involving quadratic equations (

   5m   (x + 1) m

   x m

   Use Pythagoras to show that $x^2 + x - 12 = 0$)

7. A formula for solving quadratics
   ($x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$)

8. Iteration (Find a solution between two numbers. Using trial and error)

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Chapter 9 – Surds and Indices

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1. Indices - Multiplication ($x^2 \times x^3 = x^{2+3} = x^5$)

2. Indices – Division ($x^8 \div x^3 = x^{8-3} = x^5$)

3. Negative Indices ($\dfrac{1}{x} = x^{-1}, 4x^{-3} = \dfrac{4}{x^3}$)

4. Powers of powers ($(x^2)^4 = x^{2 \times 4} = x^8$)

5. Fractional Indices ($\sqrt{x} = x^{\frac{1}{2}}$)

6. Surds ($\sqrt{ab} = \sqrt{a} \times \sqrt{b}$)

7. Further Simplification ($\sqrt{\dfrac{a}{b}} = \dfrac{\sqrt{a}}{\sqrt{b}}$)

8. Rationalising the denominator
($\dfrac{1}{\sqrt{3}} = \dfrac{1}{\sqrt{3}} \times \dfrac{\sqrt{3}}{\sqrt{3}} = \dfrac{\sqrt{3}}{\sqrt{9}} = \dfrac{\sqrt{3}}{3}$)
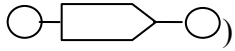
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Chapter 10 - Functions

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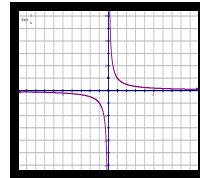
1. Illustrating a function (⊶▭⊳○)

2. Notation (f(x) = x + 4, Find (f6) = 6 + 4 = 10)
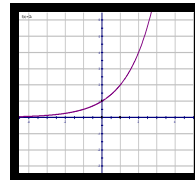
3. Graphs of linear and quadratic functions (

)
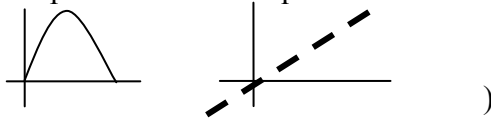
4. Sketching Quadratic functions (4 steps – (1) Find where (f(x) = 0, (2) Find the equation of its axis of symmetry (3) Find Turning point – Max or Min (4) Find where the curve cuts the y axis, x = 0.)

5. The function f(x) = $\dfrac{a}{x}$, x ≠ 0 (The function $\dfrac{a}{x}$ is the

     simplest form of a reciprocal function.

6. The function f(x) = a^x, for a = 1,2,3……

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Chapter 11 – Trigonometric graphs and equations
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1. Revision (Soh Cah Toa)

2. Exact Values

	0°	30°	45°	60°	90°
Sin	0	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$	1
Cos	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	0
Tan	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	---

3. Sines, Cosines and Tangents of angles $> 90^o$

$90 < A < 180$	$0 < A < 90$
2nd Quadrant	1st Quadrant
$180 < A < 270$	$270 < A < 360$
3rd Quadrant	4th Quadrant
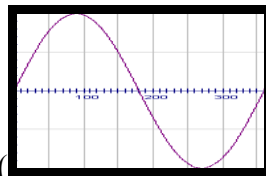
4. Trig Functions and their graphs ( )

5. Solving Trigonometric Equations (Sin x^o = 0.2, Using Quadrants shown above)

6. Related Ratios ($\frac{SinA}{CosA} = TanA$)

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Chapter 12 – Trigonometry and triangle calculations

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S4^3 Course Checklist – New Maths in Action

1. The Sine Rule – Calculating Lengths and Angles
($\dfrac{a}{SinA} = \dfrac{b}{SinB} = \dfrac{c}{SinC}$)

2. The Cosine Rule – Calculating Lengths and Angles
($a^2 = b^2 + c^2 - 2bcCosA$, Cos A = $\dfrac{b^2 + c^2 - a^2}{2bc}$)

3. The Area of a Triangle (A = $\frac{1}{2}$ ab Sin C)

4. Which Formula to use? (3 sides – Cosine rule, 2 sides + angle between – Cosine Rule, 2 Sides + angle **not** between – Sin Rule, 1 side and 2 angles – Sin Rule)

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