What I can bank in Maths...N5

Mathematics Department
Inverclyde Academy

Topic	I can...	Bank
Volume of Solids	I can use the formula $V = lbh$ to work out the volume of a cuboid (cube).	1.1
	I can use the formula $V = Ah$ and area formulas to work out the volume of a prism.	1.2
	I can use the formula $V = \pi r^2 h$ to calculate the volume of a cylinder.	1.3
	I can use the formula $V = \frac{4}{3}\pi r^3$ to calculate the volume of a sphere.	1.4
	I can use the formula $V = \frac{1}{3}\pi r^2 h$ to calculate the volume of a cone.	1.5
	I can use the formula $V = \frac{1}{3}lbh$ to work out the volume of a pyramid.	1.6
	I can use my formulas for volume to work out the volume of composite shapes.	1.7

Topic	I can...	Bank
Change the subject of a formula	I can state that the subject of the formula is the letter that starts the formula on its own on the left hand side of the equals sign.	2.1
	I can rearrange a formula involving multiplication and division in fraction form including rearranging for bottom line of the fraction.	2.2
	I can rearrange a formula involving addition, subtraction, multiplication and division.	2.3
	I can rearrange a formula involving square or square root, eg $E = \frac{1}{2}mv^2$ rearranged for v.	2.4

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Topic	I can...	Bank
Simultaneous Equations	I can use a table of values or gradient and y-intercept to draw the graph of a straight line.	3.1
	I can use the graph of two drawn straight lines to find the point of intersection – the solution to the simultaneous equations.	3.2
	I can construct an algebraic equation from information given in a real life situation.	3.3
	I can solve a pair of simultaneous equations by equating them to each other, finding one value and then substituting to find the second.	3.4
	I can use the process of elimination to solve a pair of simultaneous equations.	3.5

Topic	I can...	Bank
Sine and Cosine Rule	I can calculate the area of a non-right angled triangle using the formula $A = \frac{1}{2}ab\ sinC$.	4.1
	When given the area of a non-right angled triangle, I can use the formula $A = \frac{1}{2}ab\ sinC$ to find either the length of a side or the size of an angle.	4.2
	I know that if I have two pairs of 'side with partner angle' then I must use the Sine Rule.	4.3
	I can use the Sine Rule to calculate a missing side.	4.4
	I can use the Sine Rule to calculate a missing angle.	4.5
	I can use the Cosine Rule to calculate a missing side.	4.6
	I can use the Cosine Rule to calculate a missing angle.	4.7
	I can use 3 figure bearings to make a sketch of a real life situation and use either the Sine or Cosine rule to calculate a distance or a bearing.	4.8

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Topic	I can...	Bank		Bank
Quadratics	I can recognise a quadratic function from its graph.	5.1	I can 'complete the square' on any given quadratic equation and write it in the form $y = a(x+p)^2 + q$.	5.5
	I can use the graph of a quadratic to work out its equation in the form $y = kx^2$ and $y = (x+p)^2 + q$.	5.2	I can solve a quadratic equation by factorising and setting equal to zero to find the roots.	5.6
	I can sketch a quadratic given equation in the form $y = (x-m)(x-n)$ by: • Recognising roots are m and n • Finding the x – coordinate of the turning point as midpoint of the roots. • Sub the x-coord in the original equation to get the y-coordinate of the TP. • Knowing that $+x^2$ *is a minimum* $-x^2$ *is a maximum*. Find y-intercept : $(-m) \times (-n)$.	5.3	I can solve a quadratic equation using its graph.	5.7
			I can solve a quadratic equation using the quadratic formula $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$.	5.8
	I can identify the features of or sketch a quadratic graph given the equation in the form $y = (x+p)^2 + q$ by: • Stating the TP is $(-p, q)$. • Knowing that $+x^2$ *is a minimum* $-x^2$ *is a maximum*. • Find y-intercept: $p^2 + q$ State the axis of symmetry is $x = -p$.	5.4	I can use the discriminant, $b^2 - 4ac$, to test the nature of the roots of a quadratic: $b^2 - 4ac < 0$ No real roots $b^2 - 4ac = 0$ Equal and real roots $b^2 - 4ac > 0$ Real and distinct roots	5.9

Topic	I can...	Bank
Vectors	I can add 2D vectors using directed line segments in a diagram.	6.1
	I can work out the coordinates of a point in 3 dimensions using a diagram representing a 3D object.	6.2
	I can add or subtract 2D or 3D vectors in in component form.	6.3
	I can calculate the magnitude of a vector: 2D $\lvert u\rvert = \sqrt{a^2 + b^2}$ 3D $\lvert u\rvert = \sqrt{a^2 + b^2 + c^2}$	6.4

Topic	I can...	Bank
Straight Line	I can use the gradient formula $m = \frac{y_2 - y_1}{x_2 - x_1}$ given two coordinates on the line.	7.1
	When I know the gradient of the line and I have a point on the line, I can work out the equation of the line using $y - b = m(x - a)$.	7.2
	I can use the notation $f(x)$ to represent a function and I know that $y = f(x)$ is the graph of that function.	7.3
	I can identify the gradient and y-intercept of a straight line from the equation $y = mx + c$.	7.4
	I can use my skills from change the subject of the formula to rearrange any form of an equation of a straight line to $y = mx + c$ and identify m and c from that.	7.5

Topic	I can...	Bank		Bank
Trigonometric Graphs and Equations	I can draw the graphs of $y = \sin x$, $\cos x$ and $y = \tan x$ indicating where they cross the axes and maximum/minimum values and where they occur.	8.1	Given a trig function, I can calculate the period for a trig function using formula $period = \frac{360°}{b}$, eg, Find the period of $y = \cos 3x$, and I can sketch the function.	8.7
	I can state the amplitude of a trig graph (tan being infinite) from a diagram.	8.2	Given a diagram, I can calculate the horizontal shift for a trig function, eg, Find the value of d in equation $y = \sin(x - d)$.	8.8
	I can state the amplitude of a trig graph from its equation eg the amplitude of $y = 2\sin x$ is 2.	8.3	I can sketch a trig function with a horizontal shift given the equation, eg, sketch $y = \sin(x + 3)$.	8.9
	I can draw the graphs of $y = \sin x$, $\cos x$ and $y = \tan x$ indicating where they cross the axes and maximum/minimum values and where they occur.	8.4	I can use the four quadrants and formulas of the CAST diagram to work out the sin, cos and tan of all angles 0-360°.	8.10
			I can solve trig equations using the CAST diagram to produce the correct two answers.	8.11
	I can sketch a trig function with a vertical shift given the equation, eg, sketch $y = \sin x - 3$.	8.5	I can solve trig equations using the CAST diagram and be sure to add the period if there is more than one graph in 0-360.	8.12
	Given a diagram, I can calculate the period for a trig function by counting how many full graphs I would see in 360°.	8.6	I can use the identities $cos^2x + sin^2x = 1$ and $\tan x = \frac{\sin x}{\cos x}$.	8.13

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Topic	I can...	Bank
Algebraic Fractions	I can simplify an algebraic fraction to its simplest form, knowing that I can cancel top and bottom if the terms are multiplying each other, eg, $\frac{(x+2)^2}{(x+2)(x+3)} = \frac{x+2}{x+3}$	9.1
	I can add algebraic fractions by making sure they both have the same denominator.	9.2
	I can subtract algebraic fractions by making sure they both have the same denominator.	9.3
	I can multiply algebraic fractions together and simplify where possible.	9.4
	I can divide algebraic fractions together by changing the ÷ to × and turning the second fraction upside down, then simplify where possible.	9.5

Topic	I can...	Bank
Indices and Surds	I can simplify a surd by spotting factors and using the formula $\sqrt{ab} = \sqrt{a}\sqrt{b}$.	10.1
	I can gather like terms using multiples of different surds eg $3\sqrt{2} + 5\sqrt{8} + 4\sqrt{2}$	10.2
	I can simplify a surd by spotting factors and using the formula $\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}.}$	10.3
	I know that $\sqrt{a}\sqrt{a} = a$.	10.4
	I know that to rationalise the denominator of a fraction containing a single surd on the bottom line I times top and bottom by that surd, e.g. $\frac{2}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}}$.	10.5
	I know to rationalise the denominator of a fraction containing any surd e.g. $\frac{2}{\sqrt{3}+1} \times \frac{\sqrt{3}-1}{\sqrt{3}-1}$.	10.6
	I can multiply and divide using the rules of indices including fractional indices using the rules: $x^a x^b = x^{a+b}$ and $\frac{x^a}{x^b} = x^{a-b}$.	10.7
	I know the rule: $\sqrt[b]{x^a} = x^{\frac{a}{b}}$	10.8
	I know the rule: $x^{-n} = \frac{1}{x^n}$	10.9
	I can state the results that $x^1 = x$ and $x^0 = 1$	10.10
	I know and can use the rule $(x^a)^b = x^{ab}$	10.11

Topic (B.G.E.)	I can...	Bank
Circles (MTH 4-16b and MTH 4-17a)	I can calculate the size of the radius when given the diameter and vice versa.	
	I can calculate the circumference of a circle using the formula: $C = \pi D$.	
	I can find the perimeter of shapes involving half and quarter circles.	
	I can find the size of the diameter or radius when given the circumference.	
	I can calculate the area of a circle using the formula: $A = \pi r^2$.	
	I can calculate the areas of half and quarter circles including area of composite shapes.	
	I can find the size of the radius or diameter when given the area.	
	I can use my knowledge of the circle to solve a variety of problems relating to real life situations.	
	I can calculate the minor and major arc lengths of a sector of a circle.	
	I can calculate the areas of the major and minor sectors of a circle.	
	I can calculate the size of the angle at the centre when given either the arc length or area of the sector	
	I can calculate the size of missing angles formed inside circles using my knowledge of angle and circle properties.	
	I can use my knowledge from Pythagoras and properties of a circle in order to solve problems and find missing lengths involving straight lines and circles.	

Topic (B.G.E.)	I can...	Bank
Algebra (MTH 4-14a)	I can add, subtract and multiply more complicated algebraic expressions.	
	I can multiply out a simple, single set of brackets.	
	I can multiply out brackets and then gather like terms when necessary.	
	I can multiply out double brackets and then gather like terms when necessary.	
	I can multiply out two sets of brackets with one of the brackets containing a trinomial.	

Topic (B.G.E.)	I can...	Bank
Factorising (MTH 4-14b)	I can factorise an expression by taking out a common factor.	
	I can factorise an expression by using the difference of two squares.	
	I can factorise a quadratic expression of the form: $x^2 + bx + c$.	
	I can factorise a quadratic expression of the form: $ax^2 + bx + c$.	
	I can use my knowledge of factorising to factorise an expression using the methods in the correct order.	

Topic (B.G.E.)	I can...	Bank
Rounding (MNU 4-01a)	I can round to certain accuracy after completing a calculation.	
	I can round to 1, 2, 3, . . . decimal places.	
	I can round to 1, 2, 3, . . . significant figures.	
	I can estimates and then calculate the correct answer.	

Topic (B.G.E.)	I can...	Bank
Equations and Inequalities (MTH 4-15a)	I can solve equations letters on one side, letters on both sides and with brackets.	
	I can solve equations with coefficients which are fractions.	
	I know how to use the symbols >, ≥, < and ≤ with numbers and negative numbers.	
	I can solve inequalities with letters on one side, letters on both sides and with brackets.	
	I can solve inequalities involving negative numbers.	

Topic (B.G.E.)	I can...	Bank
Pythagoras (MTH 4-16a)	I can use Pythagoras' Theorem to calculate the length of the hypotenuse on a right-angled triangle.	
	I can use Pythagoras' Theorem to calculate the length of a shorter side on a right-angled triangle.	
	Using my knowledge of Pythagoras' Theorem I can decide which formula I have to use to find the missing side on a right-angled triangle and problems relating to real life.	
	I can calculate the distance between two coordinate points.	
	I can work out whether a triangle is right-angled or not by using the Converse of Pythagoras' Theorem.	

Topic (B.G.E.)	I can...	Bank
Similarity (MTH 4-17b)	I can explain why two shapes are similar.	
	I can calculate the scale factor when a shape has been enlarged or reduced.	
	I can use the scale factor to draw an enlargement or reduction.	
	I can use the scale factor to calculate the size of a missing length on a similar shape.	
	I can calculate the area scale factor and use it to calculate the area of a similar shape.	
	I can calculate the volume scale factor and use it to calculate the volume of a similar shape.	

Topic (B.G.E.)	I can...	Bank
Percentages (MNU 3-07a, MNU 4-07a, MTH 4-09a)	I can represent a percentage increase or decrease as a decimal multiplier to help do the calculation in one step.	
	I can use a decimal multiplier to work out compound interest using the method $New\ Amount = (decimal)^{years} \times Amount$	
	I can work out the appreciation/depreciation of a value using the method $New\ Amount = (decimal)^{years} \times Amount$	
	I can calculate a reverse (past tense) percentage with the aid of a decimal multiplier and the method $Original\ Amount = \frac{New\ Amount}{Decimal}$	

Topic (B.G.E.)	I can...	Bank
Fractions (MTH 4-07b)	I can change a mixed number to a top heavy fraction.	
	I can change a top heavy fraction to a mixed number.	
	I can add and subtract fractions including mixed numbers.	
	I can multiply fractions including mixed numbers.	
	I can divide fractions including mixed numbers.	
	I can use my knowledge of fraction calculations to solve real life problems.	

Topic (B.G.E.)	I can...	Bank
Statistics (MTH 4-20b)	I can calculate the mean, mode, median and range from a set of ungrouped data.	
	I can calculate the mean, mode, median and range from a grouped data set (e.g. stem-and-leaf diagram).	
	I can find the five-figure summary for a data set (Lowest, Lower Quartile, Median, Upper Quartile, Highest).	
	I can find the median and quartiles from a Cumulative Frequency Table.	
	I can calculate the Interquartile Range and the Semi-interquartile Range using the formulae: $IQR = Q_3 - Q_1$ $SIQR = \frac{Q_3 - Q_1}{2}$	
	I can calculate the Standard Deviation with the aid of the table and using the formula: S.D = $\sqrt{\frac{\sum(x-\bar{x})^2}{n-1}}$	

Topic (B.G.E.)	I can...	Bank
Scattergraphs	I can draw a scattergraph for two sets of related data.	
	I can tell when a scattergraph has a negative or positive correlation and discuss what that means for the real life situation.	
	I can tell when a scattergraph has no correlation and discuss what that means for the real life situation.	
	I can draw a line of 'Best Fit' for a scattergraph and use this line to predict future results or estimate any missing results given information about one of the numbers used.	
	I can use my knowledge of an equation of a straight line and calculating gradient to determine the equation of a line of best fit.	
	I can use my equation of line of best fit to calculate x given y to make a more accurate prediction of a missing piece of information.	