St Thomas of Aquin's High School S2 Mathematics

Our Second Year Mathematics course links with the key Curriculum for Excellence aspects highlighted below.

My learning in mathematics enables me to:

- engage with more abstract mathematical concepts and develop important new kinds of thinking
- establish firm foundations for further specialist learning
- apply skills and understanding creatively and logically to solve problems, within a variety of contexts.

The experiences and outcomes covered are ***MTH 2-13a / MTH 3-13a / MTH 4-13a / MTH 3-14a / MTH 4-14a / MTH 4-14b MTH 3-15a / MTH 3-15b / MTH 4-15a / MTH 4-16a / MTH 4-16b / MNU 3-10a / MNU 4-10b*** and extension when appropriate.

The numeracy and mathematics: experiences and outcomes can be found at
http://www.educationscotland.gov.uk/learningteachingandassessment/curriculumareas/mathematics/eandos/index.asp

There is a major focus on the development of **Algebraic skills** from August culminating in an **Algebra** Assessment in early November. Following this we focus on three key topics; **Pythagoras, Circle and Speed/Distance/Time** with an Assessments before the Christmas holiday. In January we consolidate and further develop the work covered since August with an assessment before the February holiday. Pupils should be using the Curriculum for Excellence Level 3/4 PowerPoint and the following websites are also good for independent study at home.

Algebra

- https://www.bbc.co.uk/education/guides/zx9p34j/revision
- www.mathsisfun.com/algebra/index.html
- www.aaastudy.com/equ.htm
- https://www.bbc.com/education/subjects/zsrjpv4

Pythagoras

- www.mathsisfun.com/pythagoras.html
- https://www.bbc.co.uk/education/guides/z6knb9q/revision

Speed, Distance, Time

- https://www.bbc.co.uk/education/guides/z4swxnb/revision
- www.armyofficerselectionboard.co.uk/speed-distance-time
- http://www.mathsisfun.com/measure/metric-speed.html

Circle

- https://www.bbc.co.uk/education/guides/z2ctyrd/revision
- www.homeschoolmath.net/worksheets/circle.php
- www.youtube.com/watch?v=4bXWTyiOr2U&feature=endscreen&NR=1

General

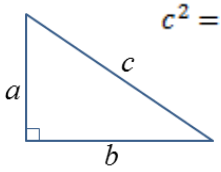
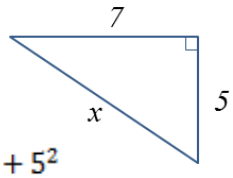
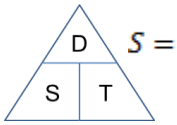
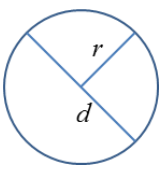
- www.mathsrevision.com
- www.supermathsworld.co.uk (Password available from your teacher)

Assessment Dates

- Algebra — November
- Pythagoras, Circle, SDT — December
- Selection of topics — February
- Any topics from S2 — June

Algebra	Examples		☹	😐	☺	Revised
Number Sequences **MTH 2-13a**	2, 5, 8, 11, _, _, next two terms? 14, 17	7, 5, 3, 1, _, _, next two terms? – 1, – 3				
Generalise (nth term) **MTH 3-15a**	3, 5, 7, 9, . . . n^{th} term is $2n+1$	9, 5, 1, -3, . . . n^{th} term is $-4n+13$ also written as $13-4n$				
Generalise from diagram **MTH 3-15b, MTH 4-13a**	Find the formula for this pattern  1 2 3 Pattern no | 1 | 2 | 3 | 4 Bricks | 3 | 5 | 7 | 9 Multiply the pattern number by 2 then add 1 (B = 2P + 1)					
Like Terms **MTH 3-14a**	$d+3d-d=3d$ $4ab+4b-3ab+2b$ $=ab+6b$	$3x+2y-2x=x+2y$ $3x^2+x+2x^2-5x$ $=5x^2-4x$				
Algebraic layout **MTH 3-14a**	$3\times r\times r=3r^2$ $9\times m\div n=\frac{9m}{n}$	$2xy\times 3y=6xy^2$ $3pq\div 9p^2=\frac{3pq}{9p^2}=\frac{q}{3p}$				
Expand brackets **MTH 4-14a**	$6(x-3)=6x-18$	$3(6x+5y)=18x+15y$				
Expand and simplify **MTH 3-14a, MTH 4-14a**	$3(d+e)+2(3d+2e)$ $=3d+3e+6d+4e$ $=9d+7e$	$8d-2(3d-3e)$ $=8d-6d+6e$ $=2d+6e$				
Basic Equations **MTH 2-15a**	$x+9=24$ $x=15$ $25-x=3$ $x=22$	$9x=72$ $x=8$ $\frac{x}{5}=3$ $x=15$				
Expand brackets (FOIL) **MTH 4-14a Extension**	$(x-4)(3x+2)$ $=3x^2+2x-12x-8$ $=3x^2-10x-8$	$(3x+4)^2$ $=(3x+4)(3x+4)$ $=9x^2+24x+16$				
Factorising **MTH 4-14b**	$5x+10x^2$ $=5x(1+2x)$	$8xy^2-4xy$ $=4xy(2y-1)$				

Algebra	Examples		☹	😐	☺	Revised
Harder equations **MTH 3-15a**	$4x - 2 = 18$ $4x = 20$ $x = 5$	$1 - 7x = 3x + 11$ $1 - 10x = 11$ $-10x = 10$ $x = -1$				
	$t - 1 = 3(5 - t)$ $t - 1 = 15 - 3t$ $4t = 16$ $t = 4$	$\frac{4x}{7} = 8$ $4x = 56$ $x = 14$				
Equations with brackets **MTH 4-14a**	$2(x + 4) = 14$ $2x + 8 = 14$ $2x = 6$ $x = 3$	$3(2x - 5) = 21$ $6x - 15 = 21$ $6x = 36$ $x = 6$				
Substitution **MTH 3-14a**	Using a = 3 b = –5 c = 7 Find (i) 6a (ii) b + c (iii) 5a – c (iv) ac – 2b = 6 x 3 = –5 + 7 = 5 x 3 – 7 = 3 x 7 – 2(–5) = 18 = 2 = 8 = 21 + 10 = 31					
Writing expressions **MTH 3-15a**	Write down expressions for the following: (i) m more than 12 (ii) 7 times h take away g (i) 12 + m (ii) 7h – g					
Writing equations **MTH 3-15a**	A number is doubled and 5 is added, the result is 17. $2x + 5 = 17$ $2x = 12$ $x = 6$	Pete has £x, John has £12 more than Pete. Altogether they have £20, how much does Pete have? $x + (x + 12) = 20$ $2x + 12 = 20$ $2x = 8$ $x = 4$ (£4)				
Change of subject 1	$P = \frac{Q + R}{3}$ $[Q]$ $3P = Q + R$ $Q = 3P - R$	$3(p - q) = 5$ $[p]$ $p - q = \frac{5}{3}$ $p = \frac{5}{3} + q$				

Algebra	Examples		☹	😐	☺	Revised
Change of subject 2	$py = qx + 5x \quad [x]$ $py = x(q+5)$ $x = \frac{py}{(q+5)}$	$A = 3(R^2 - r^2) \quad [R]$ $\frac{A}{3} = R^2 - r^2$ $R^2 = \frac{A}{3} + r^2$ $R = \sqrt{\frac{A}{3} + r^2}$				
Simultaneous equations **MTH 4-15a**	The sum of two numbers is 27 and the difference is 9. Find the two numbers. $x + y = 27$ $x - y = 9$ $2x = 36$ $x = 18$	Substitute to find *y* $x + y = 27$ $18 + y = 27$ $y = 9$ The numbers are 18 and 9				
	$4x + 3y = 31 \quad (\times 2)$ $2x - 6y = -22$ $8x + 6y = 62$ $2x - 6y = -22$ $10x = 40$ $x = 4$	Substitute to find *y* $4x + 3y = 31$ $16 + 3y = 31$ $3y = 15$ $y = 5$				
Pythagoras **MTH 4-16a**	$c^2 = a^2 + b^2$  $b^2 = c^2 - a^2$ $a^2 = c^2 - b^2$	 $x^2 = 7^2 + 5^2$ $x = \sqrt{74}$ $x = 8 \cdot 6$				
Speed, Distance, Time **MNU 3-10a, MNU 4-10b**	 $S = \frac{D}{T}$ $T = \frac{D}{S}$ $D = S \times T$	A car travels at 50 km/h for 2 hours 15 minutes? Calculate distance. $D = ST$ $= 50 \times 2 \cdot 25$ $= 112 \cdot 5 \text{ km}$				
Circle **MTH 4-16b**	$A = \pi r^2$ $C = \pi d$ 	Find the area and circumference of a circle with radius 3cm. $A = \pi r^2$ $C = \pi d$ $= \pi \times 3^2$ $= \pi \times 6$ $= 28 \cdot 3cm^2$ $= 18 \cdot 8cm$				
Including problems associated with the above three topics						