OUR LADY OF THE SACRED HEART COLLEGE
KENSINGTON

STUDENT – NAME / NUMBER: _____

MATHEMATICS TEACHER _____

2005

Year 9 – 5.3

Time allowed : 45 minutes

Assessed Outcomes

- NS5.3.1.- Performs operations with surds and indices.
- NS5.1.1. – Applies index laws to simplify and evaluate arithmetic expressions and uses scientific notation to write large and small numbers.
- PAS5.1.1, PAS 5.2.1. – Simplifies, expands and factorises algebraic expressions including those with fractions and negative and fractional indices.
- SGS5.2.1, SGS5.2.2,. Develops and applies results related to angle sum of interior and exterior angles of convex polygon. Develops and applies results for proving triangles are congruent and similar.

MARK ALLOCATION

OUTCOME	TOTAL	
NS5.3.1, NS5.1.1.		
PAS 5.1.1, PAS5.2.1		
SGS5.2.1,SGS5.2.2		

Directions to Candidates

- Show all working on the paper
- Calculators may be used
- Good Luck!!

INDICES

	QUESTION	ANSWER	MARKS
1	Simplify: a) $6mn^2 x 3m^3 n$ b) $18x^2 y \div 3y$ c) $(6y^0)^2$ d) $2^{2x} \div 2^{x-1}$	a) b) c) d)	4
2	Evaluate a) $27^{\frac{-1}{3}}$ b) 4^{-3} c) $27^{\frac{5}{3}} \div 9^{\frac{3}{2}}$ d) $81^{\frac{-3}{4}} + 27^{\frac{-4}{3}}$	a) b) c) d)	4
3.	Simplify: $8^x \times 2^{4x}$		2
		TOTAL:	/10

SCIENTIFIC NOTATION

	QUESTION	ANSWER	
1.	Write the following in standard notation. a) 138 000 000		2

	b) $0.000\,002\,3$		
2.	Simplify and write in scientific notation $\dfrac{3.98\times10^{4}\times6.42\times10^{-5}}{1.592\times10^{-3}\times1.07\times10^{7}}$		2
		TOTAL	/4

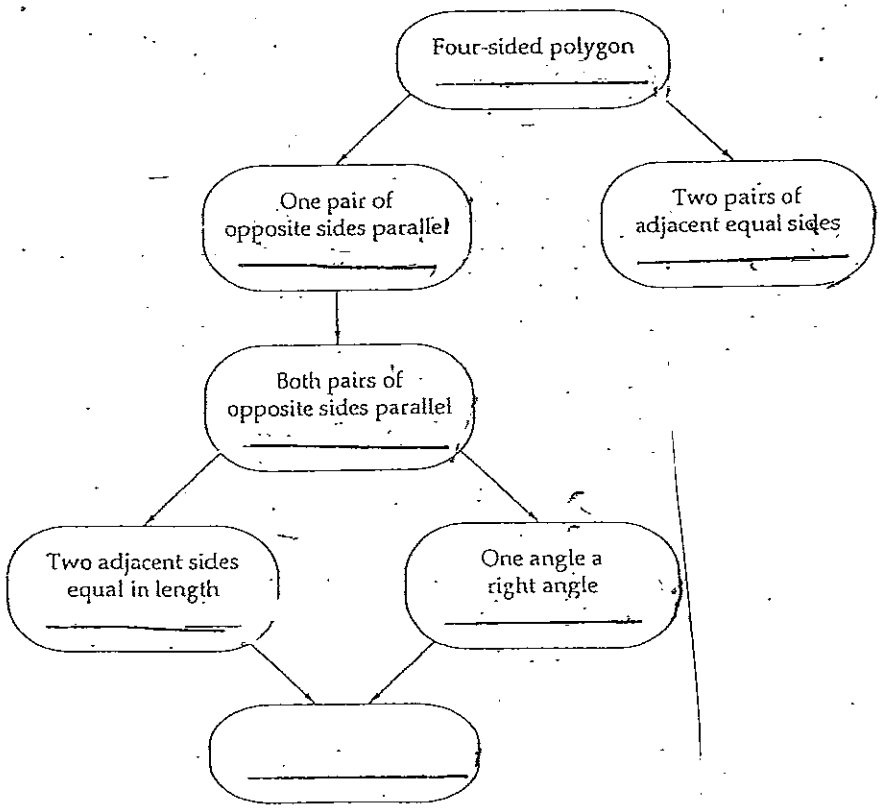
SURDS

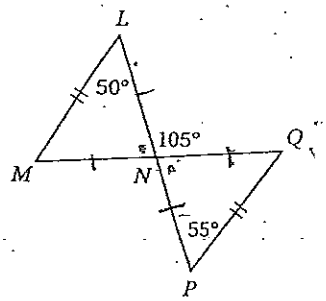
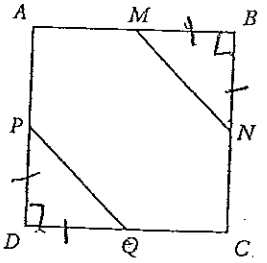
	QUESTION	ANSWER	MARKS
1	Simplify: a) $4\sqrt{2}\times3\sqrt{3}$		1
	b) $\sqrt{72}$		1
	c) $9\sqrt{12}-2\sqrt{75}$		2
2	Expand and simplify: a) $2\sqrt{2}(\sqrt{5}+5)$	a)	2
	b) $(x\sqrt{x}-y\sqrt{y})(x\sqrt{x}+y\sqrt{y})$	b)	2
3	Find a and b if $(2\sqrt{5}+3\sqrt{3})^{2}=a+b\sqrt{15}$		2

4	Rationalise the denominator a) $\frac{2\sqrt{3}}{3\sqrt{10}}$ b) $\frac{10}{2\sqrt{3}-2\sqrt{2}}$	a) b)	1 2
		TOTAL	/13

GEOMETRY:

	QUESTION	ANSWER	
1	Complete the following flow chart to show the relationship between different quadrilaterals		3



2	For a regular nonagon (9 sided polygon) find: a) the sum of the interior angles b) the size of each interior angle	a) b)	2
3	The sum of the interior angles of a regular polygon is 2880°. Find : a) the number of sides of the polygon b) The size of each interior angle.	a)	3
4.	In this diagram, $ML = PQ$, $\angle MLN = 50°$, $\angle LNQ = 105°$ and $\angle NPQ = 55°$. Prove that $MN = NP$. 		2
5	$ABCD$ is a square. P, Q, M and N are the midpoints of the sides on which they lie. Prove that $PQ = MN$. 		3
		TOTAL	/13

ANSWERS TO OLSH COLLEGE
YEAR 9 - 2005 COMMON TEST

INDICES:

1 a	$18m^4n^3$	**b**	$6x^2$	**c**	36	**d**	2^{x+1}	**2 a**	$\frac{1}{3}$
b	$\frac{1}{64}$	**c**	9	**d**	$\frac{4}{81}$	**3**	2^{7x}		

SCIENTIFIC NOTATION

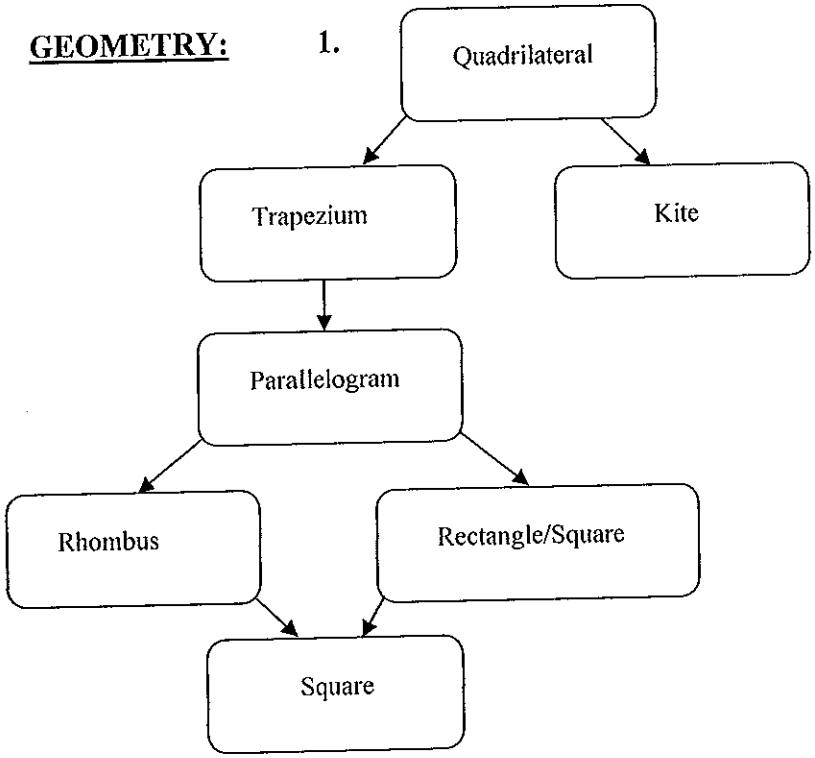
1 a	1.38×10^{8}	**b**	2.3×10^{-6}	**2**	1.5×10^{-4}		

SURDS:

1 a	$12\sqrt{6}$	**b**	$6\sqrt{2}$	**c**	$8\sqrt{3}$	**2 a**	$2\sqrt{10}+10\sqrt{2}$	**b**	x^3-y^3
3	$a=47, b=12$	**4 a**	$\frac{\sqrt{30}}{15}$	**b**	$5\left(\sqrt{3}+\sqrt{2}\right)$				

GEOMETRY:

1.



2 a	1260^0	**b**	140^0	**3 a**	18	**b**	160^0	**4**	*A.A.S.*
5	*S.A.S.*								

- **Updated 11/05**