



SENIOR PHASE

GRADE 9

NOVEMBER 2014

**MATHEMATICS
MEMORANDUM**

MARKS: 100

Important information.

- This is marking guideline. In instances where learners have used different Mathematically sound strategies to solve the problems, they (learners) should be credited.
- Underline errors committed by learners and apply Consistent Accuracy (CA) marking.

Symbol	Explanation
M	Method mark
CA	Consistent Accuracy mark
A	Accuracy mark

This memorandum consist of 9 pages.

Ques.	Solution	Mark Allocation	Total
QUESTION 1			
1.1	C	Give 1 mark for each correct answer.	
1.2	D		
1.3	B		
1.4	C		
1.5	B		
1.6	D		
1.7	B		
1.8	B		
1.9	C		
1.10	C		
			[10]
QUESTION 2			
2.1	13 ✓A	13: 1 mark	(1)
2.2	$T_n = 3n + 1$ ✓✓A OR $T_n = 4 + 3(n - 1)$ ✓✓A	$3n$: 1 mark $+1$: 1 mark 4 : 1 mark $3(n - 1)$: 1 mark	(2)
2.3	$T_{20} = 3(20) + 1$ $= 61$ ✓CA OR $T_{20} = 4 + 3(20 - 1)$ $= 61$ ✓ CA	Answer: 1 mark	(1)
			[4]
QUESTION 3			
3.1	$(5^x)^0$ $= 1$ ✓A	1: 1 mark	(1)
3.2	$\frac{x}{2} - \frac{y}{3} + 1$ $= \frac{3x-2y}{6} + \frac{6}{6}$ ✓ M $= \frac{3x-2y+1}{6}$ ✓A	Same denominator: 1 mark $3x - 2y + 1$: 1 mark	(2)

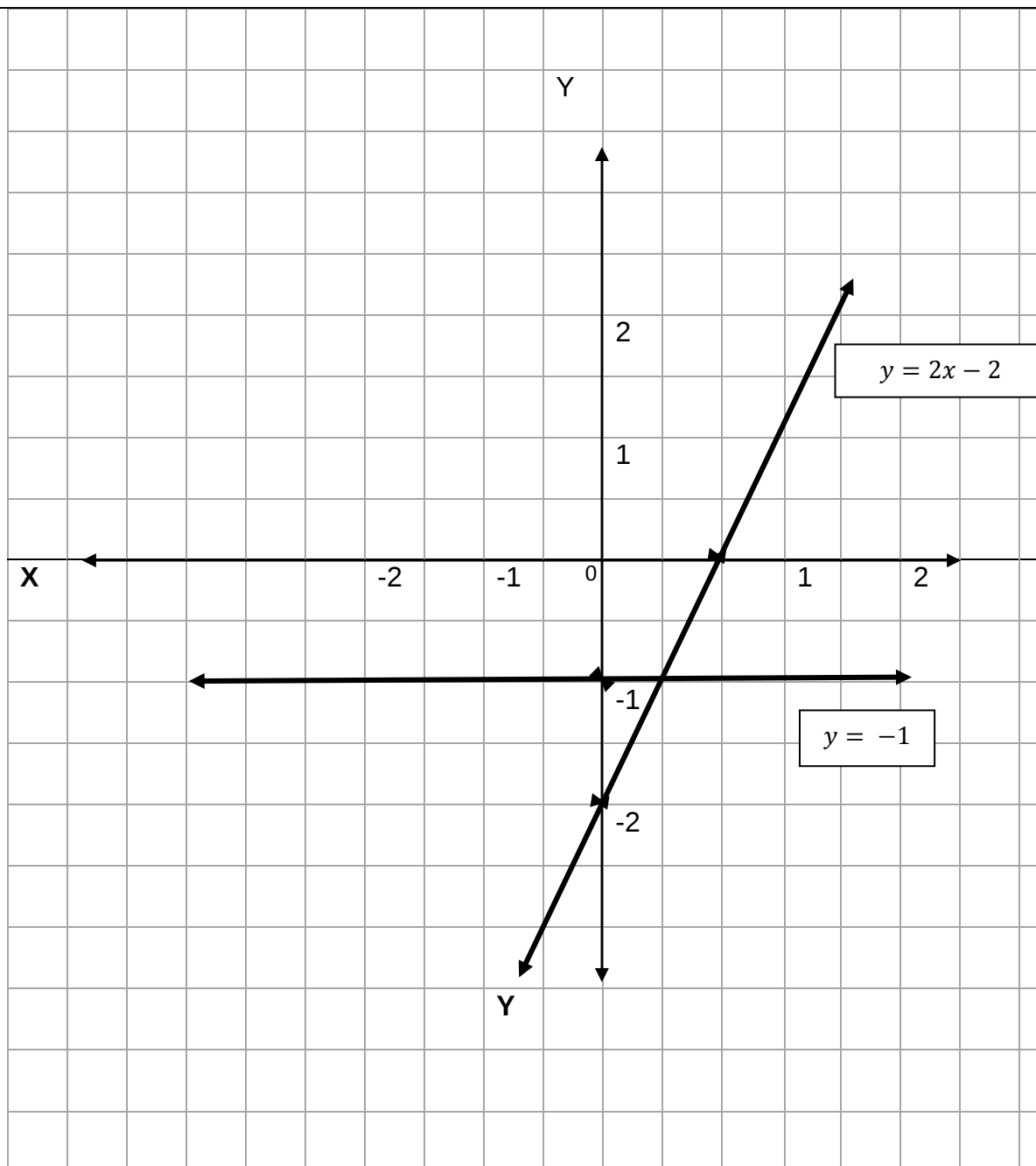
3.3	$-(3x - 2)^2 + 4x$ $= -(9x^2 - 6x + 4) + 4x \quad \checkmark \text{ M}$ $= -9x^2 + 6x - 4 + 4x \quad \checkmark \text{ M}$ $= 9x^2 + 10x - 4 \quad \checkmark \text{ CA}$	$9x^2 - 6x + 4$: 1 mark $-9x^2 + 6x - 4$: 1 mark $-9x^2 + 10x - 4$: 1 mark	(3)
			[6]
QUESTION 4			
4.1	$x^2 - 8x + 15$ $= (x - 3)\checkmark(x - 5) \quad \checkmark \text{ A}$	$(x - 3)$: 1 mark $(x - 5)$: 1 mark	(2)
4.2	$\frac{1}{2}x^2 - 8$ $= \frac{x^2 - 16}{2} \quad \checkmark \text{ A}$ $= \frac{(x-4)(x+4)}{2} \quad \checkmark \text{ A}$	$\frac{x^2 - 16}{2}$: 1 mark $\frac{(x-4)(x+4)}{2}$: 1 mark	(2)
4.3	$x^2 + 3x + tx + 3t$ $= x(x + 3) + t(x + 3) \quad \checkmark \text{ M}$ $= (x + 3)\checkmark(x + t) \quad \checkmark \text{ A}$	Grouping: 1 mark $(x + 3)$: 1 mark $(x + t)$: 1 mark	(3)
			[7]
QUESTION 5			
5.1	$3x + 4 = 10$ $\frac{3x}{3} = \frac{10-4}{3} \quad \checkmark \text{ M}$ $x = 2 \quad \checkmark \text{ A}$	Calculation: 1 mark Answer: 1 mark	(2)
5.2	$\frac{x}{3} + \frac{x+5}{2} = 0$ $6\left(\frac{2x+3x+15}{6}\right) = 0 \times 6 \quad \checkmark \text{ M}$ $5x + 15 = 0 \quad \checkmark \text{ M}$ $5x = -15$ $x = -3 \quad \checkmark \text{ CA}$	Multiply LHS and RHS by 6 Simplification: 1 mark Answer: 1 mark	(3)
5.3	$x^3 = 125$ $x^3 = 5^3 \quad \checkmark \text{ M}$ $x = 5 \quad \checkmark \text{ A}$ OR $x^3 = 125$ $x = \sqrt[3]{125} \quad \checkmark \text{ M}$ $x = 5 \quad \checkmark \text{ A}$	Calculation: 1 mark Answer: 1 mark	(2)
			[7]

QUESTION 6																			
6.1	$1,7 \times 10^{13} \checkmark A$	Answer: 1 mark	(1)																
6.2	$90 \text{ km/h} = \frac{7}{2} h$ $\therefore x \text{ km/h} = 3 h$ $3 \times x \text{ km/h} \checkmark = 90 \times \frac{7}{2} \checkmark M$ Average speed = $105 \text{ km/h} \checkmark A$	$3 \times x \text{ km/h}: 1 \text{ mark}$ $90 \times \frac{7}{2}: 1 \text{ mark}$ Answer: 1 mark	(3)																
6.3	$S.I. = \frac{P.n.r}{100} \checkmark M$ $= \frac{R4\,400 \times 4 \times 7}{100} \checkmark M$ $= R1\,232.00 \checkmark CA$ OR $SI = Pni \checkmark M$ $= 4\,400 \times 7 \times 0,04 \checkmark M$ $= R\,1\,232,00 \checkmark CA$	Formula: 1 mark Substitution: 1 mark Answer: 1 mark	(3)																
6.4	$A = P(1 + \frac{r}{100})^n$ $= 5\,600P(1 + \frac{7}{100})^4 \checkmark M$ $= R7\,340,46 \checkmark CA$ OR $A = P(1 + i)^n$ $= 5\,600(1 + 0,07)^4 \checkmark M$ $= R7\,340,46 \checkmark CA$	Substitution: 1 mark Answer: 1 mark	(2)																
6.5	<table><tr><td>now</td><td>6yrs ago</td></tr><tr><td>Son is x</td><td>$x - 6$</td></tr><tr><td>Father $3x$</td><td>$3x - 6$</td></tr><tr><td>$3x - 6 = 5(x - 6) \checkmark M$</td><td></td></tr><tr><td>$2x = 24 \checkmark M$</td><td></td></tr><tr><td>$x = 12$</td><td></td></tr><tr><td>Son = 12 years $\checkmark A$</td><td></td></tr><tr><td>Father = 36 years $\checkmark CA$</td><td></td></tr></table>	now	6yrs ago	Son is x	$x - 6$	Father $3x$	$3x - 6$	$3x - 6 = 5(x - 6) \checkmark M$		$2x = 24 \checkmark M$		$x = 12$		Son = 12 years $\checkmark A$		Father = 36 years $\checkmark CA$		Correct statement: 1 mark Calculation: 1 mark 12 years: 1 mark 36 years: 1 mark	(4)
now	6yrs ago																		
Son is x	$x - 6$																		
Father $3x$	$3x - 6$																		
$3x - 6 = 5(x - 6) \checkmark M$																			
$2x = 24 \checkmark M$																			
$x = 12$																			
Son = 12 years $\checkmark A$																			
Father = 36 years $\checkmark CA$																			
			[13]																

QUESTION 7

7.1	X (−1; 4) Y(0; 5) $m = \frac{y_2 - y_1}{x_2 - x_1}$ ✓M $m = \frac{5 - 4}{0 - (-1)}$ = 1 ✓M y-intercept = 5 $y = mx + 5$ = x + 5 ✓A OR Y(0; 5) Z(1; 6) $m = \frac{y_2 - y_1}{x_2 - x_1}$ ✓M $m = \frac{6 - 5}{1 - 0}$ = 1 ✓M y - intercept = 5 $y = mx + 5$ = x + 5 ✓A OR X(−1; 4) Z(1; 6) $m = \frac{y_2 - y_1}{x_2 - x_1}$ ✓M $m = \frac{6 - 4}{1 - (-1)}$ = $\frac{2}{2}$ = 1 ✓M y-intercept = 5 $y = mx + 5$ = x + 5 ✓A Calculation: 1 mark m = 1: 1 mark Answer: 1 mark																			
7.2	<table><tr><td>x</td><td>-2</td><td>-1</td><td>0</td><td>1</td><td>2</td></tr><tr><td>y = 2x − 1</td><td>-6</td><td>-4</td><td>-2</td><td>0</td><td>2</td></tr><tr><td>y = −1</td><td>−1</td><td>−1</td><td>−1</td><td>−1</td><td>−1</td></tr></table>	x	-2	-1	0	1	2	y = 2x − 1	-6	-4	-2	0	2	y = −1	−1	−1	−1	−1	−1	
x	-2	-1	0	1	2															
y = 2x − 1	-6	-4	-2	0	2															
y = −1	−1	−1	−1	−1	−1															

7.2



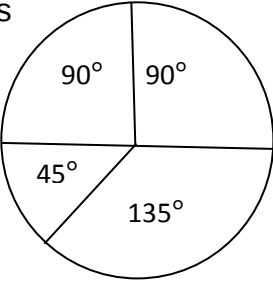
x -intercept : 1 mark ✓
 y -intercept : 1 mark per graph ✓ + ✓
Labelling graph ✓ + ✓
(5)

[8]

QUESTION 8				
8.1	8.1.1	$\widehat{SRT} = \widehat{Q} = x + 70^\circ$ (corr. $\angle s$, $RT \parallel QP$) ✓A $\widehat{S} + \widehat{T} + \widehat{RS} + \widehat{P} = 180^\circ$ (sum of f $\angle s$ of Δ) ✓A $x + 10^\circ + 28^\circ + 70^\circ = 180^\circ$ $2x + 108^\circ = 180^\circ$ $2x = 72^\circ$ ✓A $x = 36^\circ$ ✓A	Correct statement with reason: 1 mark Correct statement with reason: 1 mark Simplification: 1 mark Answer: 1 mark	(4)
	8.1.2	$\widehat{STR} = \widehat{P} = x + 10^\circ$ ✓A (corr. $\angle s$, $RT \parallel QP$) ✓ $\angle \widehat{STR} = 36^\circ + 10^\circ$ $= 46^\circ$ ✓A	Correct statement: 1 mark Correct statement: 1 mark Answer: 1 mark	(3)
	8.1.3	$\widehat{SRT} = \widehat{Q} = x + 70^\circ$ (corr. $\angle s$, $RT \parallel QP$) $x + 70^\circ = 36^\circ + 70^\circ$ ✓A $= 106^\circ$ $106^\circ \neq 90^\circ$ $\therefore PQS$ is not a right angled triangle ✓A	Correct statement: 1 mark Substitution: 1 mark Answer: 1 mark	(3)
8.2	8.2.1	In ΔABC and ΔTSP $\widehat{B} = \widehat{P} = 70^\circ$ (given) ✓ $\widehat{C} = \widehat{S} = 70^\circ$ (base $\angle s$ of is os. Δ) ✓A $\widehat{A} = \widehat{T} = 40^\circ$ (sum of $\angle s$ of Δ) ✓A $\therefore \Delta ABC \parallel \Delta TSP$ ($\angle \angle \angle$) ✓A	Correct statement with reason: 1 mark Correct statement with reason: 1 mark Correct statement with reason: 1 mark Correct statement with reason: 1 mark	(4)
	8.2.2	$y = AC = 15$ (given) ✓A $\frac{PS}{BC} = \frac{TS}{AB} = \frac{PT}{AC}$ (Sides are proportional) ✓A $\frac{x}{12} = \frac{5 \times 12}{15}$ $\therefore x = 4$ units ✓A	Correct statement with reason: 1 mark Correct statement with reason: 1 mark Answer: 1 mark	(3)
8.3	8.3.1	In ΔABC and ΔDCB 1. $\widehat{A} = \widehat{D}$ (given) ✓A 2. $\widehat{ACB} = \widehat{DBC}$ (given) ✓A 3. $BC = BC$ (Common) ✓A 4. $\Delta ABC \equiv \Delta DCB$ ($\angle \angle S$) ✓A	Correct statement with reason: 1 mark Correct statement with reason: 1 mark Correct statement with reason: 1 mark Correct statement with reason: 1 mark	(4)

	8.3.2	$AB = DC$ (From congruency) ✓A $\therefore BC = 4$ units ✓A	Correct statement with reason: 1 mark Answer: 1 mark	(2)
				[23]
QUESTION 9				
9.1		$P'(-4; -1)$ ✓A $Q'(-1; 3)$ ✓A $R'(4; 1)$ ✓A	Answer: 1 mark Answer: 1 mark Answer: 1 mark	(3)
9.2		Translation ✓A	Answer: 1 mark	(1)
				[4]
QUESTION 10				
10.1		$V = \pi r^2 h$ ✓M $= (3,14 \times 7^2) \text{ cm}^2 \times 20 \text{ cm}^1$ ✓M $= 3,14 \times 49 \text{ cm}^2 \times 20 \text{ cm}$ $= 3077,2 \text{ cm}^3$ ✓A	Formula: 1 mark Substitution: 1 mark Answer: 1 mark	(3)
10.2		In $\triangle DBC$ $DB^2 = 64 + 34 \text{ cm}^2$ (Pythagoras) ✓ M $= 100 \text{ cm}^2$ $= 10 \text{ cm}$ ✓ A In $\triangle ABD$: $AD^2 = (26^2 - 10^2) \text{ cm}^2$ (Pythagoras) ✓ M $= (676 - 100) \text{ cm}^2$ $= 576 \text{ cm}^2$ $\therefore AD = 24 \text{ cm}$ ✓ A	Correct statement with reason: 1 mark 10cm: 1 mark Correct statement with reason: 1 mark Answer: 1 mark	(4)
10.3		$V = 30 \text{ cm}^3$ (given) Volume when all dimensions are doubled: $V = 10 \text{ cm} \times 6 \text{ cm} \times 4 \text{ cm}$ ✓ M $= \frac{240}{30} \text{ cm}^3$ $= 8$ 8 times ✓ A	Calculation: 1 mark 8 times: 1 mark	(2)
				[9]

QUESTION 11

11.1	Tennis = $\frac{12}{48} \times 360^\circ = 90^\circ$ ✓M Rugby = $\frac{18}{48} \times 360^\circ = 135^\circ$ Cricket = $\frac{6}{48} \times 360^\circ = 45^\circ$ ✓M Swimming = $\frac{12}{48} \times 360^\circ = 90^\circ$ Tennis Swimming Cricket Rugby  <u>Pie chart showing learners participating in different extra-mural activities</u> ✓A		Calculation for any two: 1 mark Calculation for any two: 1 mark Pie chart: 1 mark Label: 1 mark	(4)													
11.2	Range = 145 – 116 = 29 ✓A		Answer: 1 mark	(1)													
11.3	11.3.1	<table><tr><td colspan="2" rowspan="2"></td><th colspan="2">Second toss</th></tr><tr><th>Head</th><th>Tail</th></tr><tr><th rowspan="2">First toss</th><th>Head</th><td>H ; H</td><td>H ; T</td></tr><tr><th>Tail</th><td>T ; H</td><td>T ; T</td></tr></table> ✓ ✓A			Second toss		Head	Tail	First toss	Head	H ; H	H ; T	Tail	T ; H	T ; T	Answer: 1 mark Answer: 1 mark	(2)
		Second toss															
		Head	Tail														
First toss	Head	H ; H	H ; T														
	Tail	T ; H	T ; T														
	11.3.2	$n(S) = 4$ ✓A	Answer: 1 mark	(1)													
	11.3.3	$P(\text{at least T}) = \frac{3}{4}$ ✓A	Answer: 1 mark	(1)													
				[9]													
	TOTAL:			100													