Carlingford High School

Mathematics

Year 9_5.2 Term 1 Examination 2017

Name: _____ Class: 9M 2. _

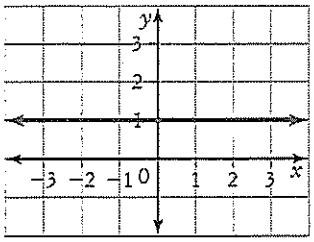
Circle your teacher's name: **Mr. Cheng** **Mrs. Tomar** **Mrs. Pennington**

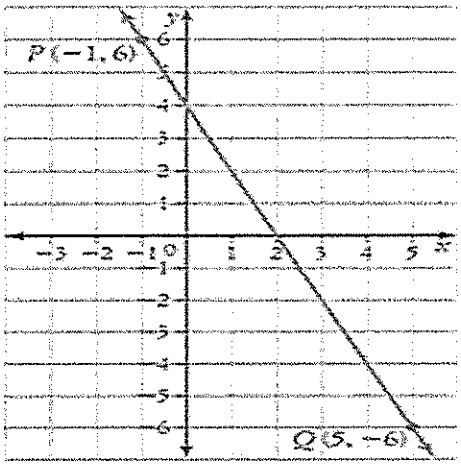
Time allowed: **55 minutes**

- Show all necessary working.
- Answer all questions in the spaces provided.
- Questions marked with an asterisk * are extension level questions.
- Marks may be deducted for careless or untidy work.
- Complete the examination in blue or black pen

Topic	Linear Relationship	Consumer Arithmetic	Measurement & Geometry	Total	
Standard	/27	/24	/8	/59	
*Extension	/6	/4		/10	
Total	/33	/28	/8	/69	%

	Linear Relationship	Marks
1	Which one of these points lies on the line $y = 3x - 4$? **A** (5, 4) **B** (−1, 12) **C** (2, 2) **D** (4, 3)	(1)
2	The gradient of $y = -3x - 6$ is: **A** −6 **B** −3 **C** 2 **D** 3	(1)
3	The y-intercept of $y = -3x - 6$ is: **A** −6 **B** −3 **C** 2 **D** 3	(1)
4	For each of the following use the word list below to fill in the blank line. **Midpoint** **Constant** **Interval** **Gradient** **Coefficient** a) The number part of an equation._____ b) The part of a line between two given points._____ c) The point that marks the middle of an interval. _____ d) The slope of a line or interval. _____	(4)

5	What is the equation of this line?  A $y = x + 1$ B $x = 0$ C $x = 1$ D $y = 1$	(1)
6	What are the gradient and y – intercept of each of the following lines? (a) $y = 2x - 3$ Gradient = y-intercept = (b) $y = \frac{x}{3} + 5$ Gradient = y-intercept =	(2) (2)
8	Use the Distance formula to find the distance between the points: (4, 2) and (7, 6)	(2)
9	Find ***b*** if the given point lies on the given line. $(-1,3)$, $y = 2x + b$	(1)

10	Use the graph to find the following: **(a)** midpoint of the interval PQ: **(b)** gradient of the line PQ:  	**(2)** **(2)**
12	Rearrange the given equation into gradient- intercept form: $4x - y + 6 = 0$	**(1)**
13	Find the gradient of a line that passes through the points: (3, 1) and (1, 5).	**(2)**
***15**	You may use the formulae for the following calculations $m = \frac{y_2 - y_1}{x_2 - x_1}$ Midpoint $= \left[\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right]$ $d = \sqrt{(x_2 - x_1)^2 - (y_2 - y_1)^2}$	

For the interval AB, where A (-4, 2) and $B(4, 6)$, Calculate the

a) Midpoint **(2)**

b) Gradient **(2)**

c) Distance AB in **surd form.** **(2)**

16 Complete the following tables

a) $y = 2x - 1$

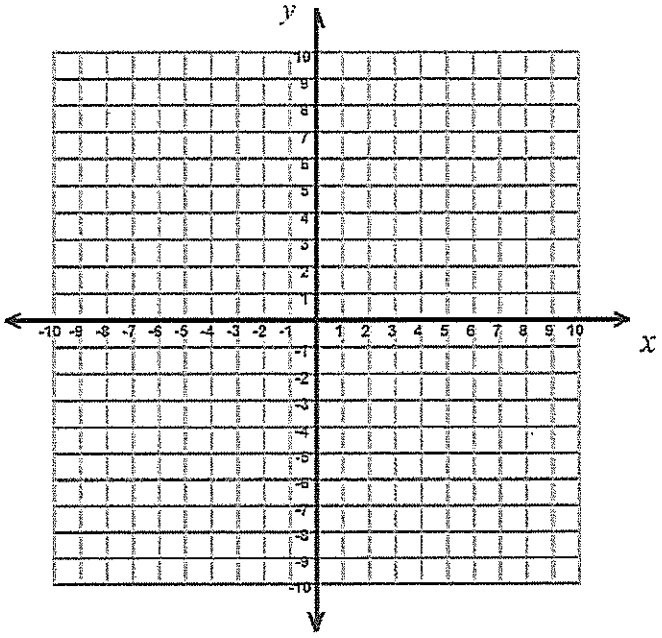
x	0	1	2
y	-1		

(1)

b) $y = -x + 2$

x	-1	2	3
y	3		

(1)

	c) Graph and label the lines in part a) and b) on the number plane below:  	(2)
	d) What is the point of intersection of the two lines? _____	(1)
	Financial Mathematics	
1	A plumber charges $65.50 per hour for labour. Find the charges for labour if he works from 6.30am till 4.30pm.	(1)
2	Leanne earns a salary of $62400 p.a. How much (correct to the nearest cent) does she earn: **a)** Each week?	(1)

	b) Each fortnight?	**(1)**
	c) Each month?	**(1)**
3	Sarah is paid \$28.30per hour for a 38-hour week. Layla receives \$27.25 per hour for a 39 hour week. a) Find Sarah and Layla's weekly wage.	**(2)**
	b) Who has the highest weekly wage and by how much?	**(2)**
4	Last week Rani worked her normal 38 hours, then 4 hours at time-and-a-half and 5 hours at double time. She was paid \$909.90for the week. Find her hourly rate of pay.	**(2)**
5	Frank works 40 hours a week and is paid \$13.40per hour. Calculate: a) Frank's weekly income.	**(1)**

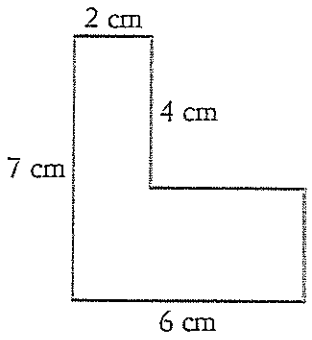
	b) The annual leave loading of 17.5 % on 4 weeks' pay	(1)
	c) Frank's total pay for the four week holiday	(1)
6	Tim is a department store manager who earned a gross salary last financial year of $141542 and had the following allowable deductions: $ 378 uniform cleaning costs, $218 training course costs and $1492 travel expenses. Calculate: a) Tim's taxable income	(1)
	b) The amount of income tax Tim should pay using the following table.	(2)

Taxable income	Tax on this income
0–$18 200	Nil
$18 201–$37 000	19c for each $1 over $18 200
$37 001–$80 000	$3572 plus 32.5c for each $1 over $37 000
$80 001 – $180 000	$17 547 plus 37c for each $1 over $80 000
$180 001 and over	$54 547 plus 45c for each $1 over $180 000

7	Mark is paid \$3.40 for each T-shirt he makes. How many T-shirts must he make to earn over \$580?	(2)
*8	Balun earns a gross pay of \$584.60 per week. Her deductions are for PAYG tax, \$38.60 for private health insurance and \$54.90 for superannuation. **a)** Use the PAYG tax table to find Balun's PAYG tax per week. **b)** Calculate Balun's net pay.	(1) (1)

Weekly pay (\$)	PAYG tax withheld (\$)
576–583	164
584–593	166
594–603	168
604–611	170
612–620	172

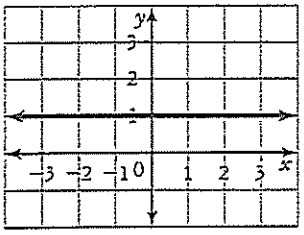
	c) What are balun's total deductions as a percentage of her gross income (correct to one decimal place)?	**(2)**
9	Chila was given a discount of 35% on a shirt with a marked price of \$79. How much did she pay?	**(1)**
10	An item has marked price of \$190 in two different shops. Shop A offers a 15% discount while shop B offers a discount of \$27.99. **a)** Which is the better buy? **b)** and how much?	**(2)** **(1)**
11	Find the simple interest on \$5000 at 4% p.a. for 7 months.	**(2)**

	Measurement and Geometry	
1	1 tonne =_____ kg 1 hour =_____ seconds	(2)
2	What are the limits of accuracy of this tape measure?  _____	(2)
3	 Calculate: **a)** the perimeter of this L-shape _____ **b)** the area of the L-shape. _____	(2) (2)

END OF EXAMINATION

	Linear Relationship	Marks
1	Which one of these points lies on the line $y = 3x - 4$? **A** (5, 4) **B** (−1, 12) **C** (2, 2) **D** (4, 3)	(1)
2	The gradient of $y = -3x - 6$ is: **A** −6 **B** −3 **C** 2 **D** 3	(1)
3	The y-intercept of $y = -3x - 6$ is: **A** −6 **B** −3 **C** 2 **D** 3	(1)
4	For each of the following use the word list below to fill in the blank line. **Midpoint** **Constant** **Interval** **Gradient** **Coefficient** a) The number part of an equation. coefficient / constant b) The part of a line between two given points. Interval c) The point that marks the middle of an interval. mid point d) The slope of a line or interval. Gradient	(4)

5 What is the equation of this line? **(1)**



A $y = x + 1$ B $x = 0$

C $x = 1$ (D) $y = 1$

6 What are the gradient and y – intercept of each of the following lines?

(a) $y = 2x - 3$ **(2)**

Gradient = 2 (1) y-intercept = -3 (1)

(b) $y = \frac{x}{3} + 5$ **(2)**

Gradient = $\frac{1}{3}$ (1) y-intercept = 5 (1)

8 Use the Distance formula to find the distance between the points: **(2)**

(4, 2) and (7, 6)

$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$= \sqrt{(7-4)^2 + (6-2)^2}$ ✓ (1)

$= \sqrt{(3)^2 + (4)^2}$

$= \sqrt{9+16} = \sqrt{25} = 5$ ✓ (1)

9 Find ***b*** if the given point lies on the given line. **(1)**

(−1,3), $y = 2x + b$

$3 = 2(-1) + b$

$3 = -2 + b$

$3 + 2 = b$ $\therefore b = 5$ ✓ (1)

10 Use the graph to find the following:

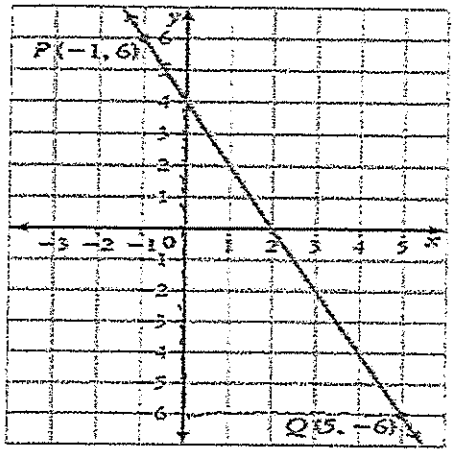
(a) midpoint of the interval PQ:

The average of x-coordinates of point P and Q is $\left(\frac{-1+5}{2}\right)=\frac{4}{2}=2$ ✓ (2)

(b) gradient of the line PQ:

The ave. of y-coordinates of the interval PQ is $\left(\frac{6-6}{2}\right)=0$ ✓ (2)

The mid point is the point (2,0) ✓ (1)



b) $\text{Gradient} = \frac{\text{rise}}{\text{run}} = \frac{-10}{5} = -2$ ✓ ✓

12 Rearrange the given equation into gradient- intercept form: $4x - y + 6 = 0$ (1)

$y = 4x + 6$

13 Find the gradient of a line that passes through the points: (3, 1) and (1, 5). (2)

$m = \frac{y_2 - y_1}{x_2 - x_1}$ ✓ (1)

$= \frac{5-1}{1-3} = \frac{4}{-2}$

$= -2$ ✓ (1)

***15** You may use the formulae for the following calculations

$m = \frac{y_2 - y_1}{x_2 - x_1}$ Midpoint $= \left[\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right]$

$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

For the interval AB, where A (-4, 2) and $B(4, 6)$, Calculate the

a) Midpoint $m = \left(\frac{-4+4}{2}, \frac{2+6}{2}\right)$ ✓ (1) **(2)**

$(0, 4)$ ✓ (1)

b) Gradient $m = \frac{6-2}{4-(-4)}$ ✓ (1) **(2)**

$= \frac{4}{4+4} = \frac{4}{8} = \frac{1}{2}$ ✓ (1)

c) Distance AB in **surd form**. $\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

$= \sqrt{(4+4)^2+(6-2)^2}$ ✓ (1) **(2)**

$= \sqrt{8^2+4^2}$

$= \sqrt{64+16}$

$= \sqrt{80}$ ✓ (1)

16 Complete the following tables

a) $y = 2x - 1$

x	0	1	2
y	−1	1	3

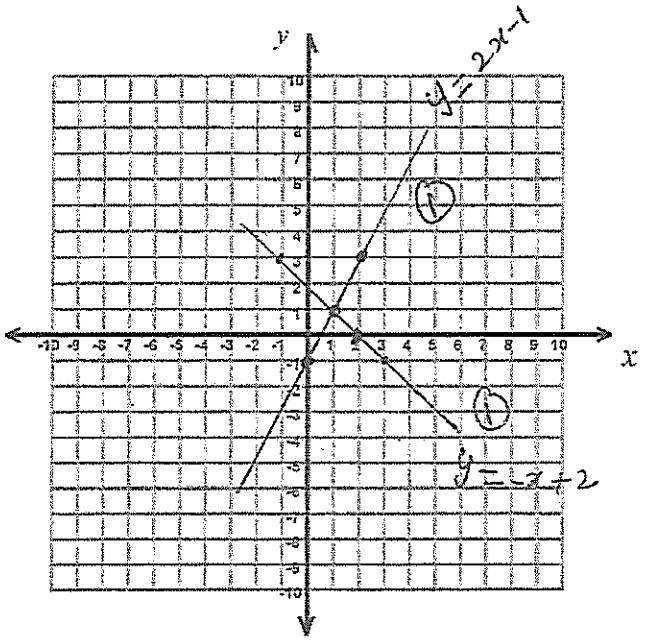
(1)

b) $y = -x + 2$

x	−1	2	3
y	3	0	−1

(1)

c) Graph and label the lines in part a) and b) on the number plane below: (2)



d) What is the point of intersection of the two lines? (1)

(1, 1)

Financial Mathematics

1 A plumber charges $65.50 per hour for labour. Find the charges for labour if he works from 6.30am till 4.30pm. (1)

65.50 × 10 = $655

2 Leanne earns a salary of $62400 p.a. How much (correct to the nearest cent) does she earn: (1)

a) Each week?

62400 ÷ 52 or 52.18

= $1200 = $1195.86

	b) Each fortnight? $2 \times 1195.86 = \$2391.72$ or $2 \times 1200 = \$2400$	(1)
	c) Each month? $62400 \div 12 = \$5200$	(1)
3	Sarah is paid \$28.30per hour for a 38-hour week. Layla receives \$27.25 per hour for a 39 hour week. a) Find Sarah and Layla's weekly wage. Sarah's weekly wage $= 38 \times 28.30 = \$1075.40$ (1) Layla's weekly wage $= 27.25 \times 39 = \$1062.75$ (1) b) Who has the highest weekly wage and by how much? Sarah has the highest weekly wage. (1) By How much ? $1075.40 - 1062.75 = \$12.65$	(2) (2)
4	Last week Rani worked her normal 38 hours, then 4 hours at time-and-a-half and 5 hours at double time. She was paid \$909.90for the week. Find her hourly rate of pay. Equivalent number of normal hours $= 38 + (4 \times 1.5) + (5 \times 2)$ $= 54$ (1) Hourly rate of pay $= \$909.90 \div 54$ $= \$16.85$ (1)	(2)
5	Frank works 40 hours a week and is paid \$13.40per hour. Calculate: a) Frank's weekly income. $40 \times 13.40 = \$536$	(1)

b) The annual leave loading of 17.5 % on 4 weeks' pay (1)

Leave loading = 17.5% × 536 × 4 — (1)

= $375.20

c) Frank's total pay for the four week holiday (1)

Total holiday pay = (4 × 536) + 375.20 — (1)

= $2519.20

6 Tim is a department store manager who earned a gross salary last financial year of $141542 and had the following allowable deductions:
$ 378 uniform cleaning costs, $218 training course costs and $1492 travel expenses.

Calculate:

a) Tim's taxable income = Gross Income − allowable deductions (1)

= 141 542 − 378 − 218 − 1492 =

= $139,454

b) The amount of income tax Tim should pay using the following table. (2)

Taxable income	Tax on this income
0–$18 200	Nil
$18 201–$37 000	19c for each $1 over $18 200
$37 001–$80 000	$3572 plus 32.5c for each $1 over $37 000
$80 001 – $180 000	$17 547 plus 37c for each $1 over $80 000
$180 001 and over	$54 547 plus 45c for each $1 over $180 000

Income Tax = (1)

17547 + (141542 − 80,000) × .37

= 17547 + 22770.54

= $40,317.54 — (1)

7	Mark is paid \$3.40 for each T-shirt he makes. How many T-shirts must he make to earn over \$580? $580 \div 3.40 = 170.58$ (1) $= 171$ Tshirts (1)	(2)
*8	Balun earns a gross pay of \$584.60 per week. Her deductions are for PAYG tax, \$38.60 for private health insurance and \$54.90 for superannuation.	
	a) Use the PAYG tax table to find Balun's PAYG tax per week.	(1)

Weekly pay (\$)	PAYG tax withheld (\$)
576–583	164
584–593	166
594–603	168
604–611	170
612–620	172

Weekly PAYG tax = \$166

b) Calculate Balun's net pay. (1)

Net pay = $584.60 - 166 - 38.60 - 54.90$ (1)

$= \$325.10$

	c) What are balun's total deductions as a percentage of her gross income (correct to one decimal place)? Total deduction = 166 + 38.60 + 54.90 = 259.50 — (1) Deduction percentage = $\frac{259.50}{584.60} \times 100\%$ = 44.38 ≈ 44.4 — (1)	**(2)**
9	Chila was given a discount of 35% on a shirt with a marked price of \$79. How much did she pay? Paid = 79 × 65% — (1) = \$ 51.35	**(1)**
10	An item has marked price of \$190 in two different shops. Shop A offers a 15% discount while shop B offers a discount of \$27.99. **a)** Which is the better buy? A: Selling Price: 190 × 85% — (1) = 161.5 B: Selling Price = 190 − 27.99 = 162.01 shop A is better buy. — (1) **b)** and how much? Difference = 162.01 − 161.5 = \$ 0.51 or 51 c — (1)	**(2)** **(1)**
11	Find the simple interest on \$5000 at 4% p.a. for 7 months. I = PRN I = 5000 × 0.04 × 7/12 — (1) = \$ 116.67 — (1)	**(2)**

Measurement and Geometry

1 (2)

1 tonne = 1000 kg (1)

1 hour = 3600 seconds (1)

2 (2)

What are the limits of accuracy of this tape measure?

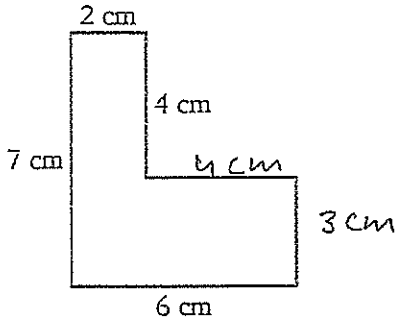
Size of one unit on scale = 2cm (1)

Limit of accuracy are = ±0.5 × 2

= ±1 (1)

± 1cm

3



Calculate:

a) the perimeter of this L-shape (2)

6 + 3 + 4 + 4 + 2 + 7 = 26cm (1)

26 cm (1)

b) the area of the L-shape. (2)

Area = 2 × 7 + 4 × 3 (1)

= 14 + 12

= 26 cm^2 (1)

END OF EXAMINATION