Carlingford High School

Mathematics

Year 9 5.2 Term 1 Examination
2018

Name: _____

Circle your teacher's name:

Mrs Lobejko Mrs Lego/Wilson Mr Wilson Miss Aung

Time allowed: 50 minutes

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

Topic	Literacy Component	Financial Mathematics	Linear Relationships	Total
Mark	/7	/24	/14	/45
Extension*		/3	/4	/7
Total	/7	/27	/18	/52

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Literacy Component **Mark**

(1) Use 7 of the following words to fill in the blanks below. **7**

Interval	Commission	Gross	Salary	Gradient
Net	Linear	Wage	Midpoint	Principal

(a) The graph of a _____ equation is a straight line.

(b) A _____ is a fixed yearly income.

(c) An _____ is a part of a line with definite length.

(d) Income that is usually calculated on the number of hours worked is called a _____.

(e) The _____ is the amount of money invested or borrowed, on which interest is given or charged.

(f) _____ pay is the total amount a person earns before deductions.

(g) The steepness of a line is called the _____.

Financial Mathematics

Mark

Note: In this exam, assume there are 365 days in year, and 52 weeks in a year.

(2) Find the simple interest earned on an investment of $15,000 at 4% p.a. for 5 years. **2**

(3) Mita works in a café and earns $21.50 per hour. She works a 36-hour week. Calculate Mita's earnings from the café for one week. **1**

(4) Lola earns $12.40 for each lawn that she mows. How many lawns will Lola have to mow to earn exactly $434? **1**

(5) Christopher earns 3.5% on the value of laptops that he sells. How much will Christopher earn if he sells $12,000 worth of laptops in one week? **1**

(6) Frank earns $1,104 a week. He receives an annual leave loading of 17.5% on 4 weeks of pay. Calculate Frank's total pay for a 4-week holiday. **3**

(7) Selina worked a 45-hour week. She is paid according to the following structure: **3**

Normal rate = $18.70	
Normal rate	For the first 37 hours
Time-and-a-half	For the next 5 hours
Double Time	For each additional hour

Calculate Selina's pay for the week.

(8) Devita earns a salary of $3,448.08 per fortnight. Calculate the amount that Devita earns per month. **1**

(9) In one week, Andrew was paid $1,215 for working 24 hours at normal time and 5 hours at time-and-a-half. Calculate his hourly rate of pay. **2**

(10) Olga bought a surfboard for $1,300. She sold it for $980. Calculate:

(a) The loss. **1**

(b) The percentage loss, to one decimal place. **1**

(11) Jim paid his plumber $210, which included GST. How much GST was paid? **1**

(12) Jacinta earns **$42,611** a year. She has allowable deductions of **$328** for travel expenses and **$195** for uniform dry-cleaning.

(a) Calculate Jacinta's taxable income. **1**

(b) Calculate the income tax payable, using the following tax 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 – $87,000	$3,572 plus 32.5c for each $1 over $37,000
$87,001 – $180,000	$19,822 plus 37c for each $1 over $87,000
$180,001 and over	$54,232 plus 45c for each $1 over $180,000

(c) Throughout the year, Jacinta paid $5,980 in PAYG tax. Is Jacinta entitled to a tax refund or is she liable to pay more tax? Justify your answer with calculations. **2**

(13) Daniel earns a salary of **$51,635** and is paid fortnightly. Each pay, **PAYG tax** is deducted, along with **$26.50** for private health insurance and **$40** for superannuation.

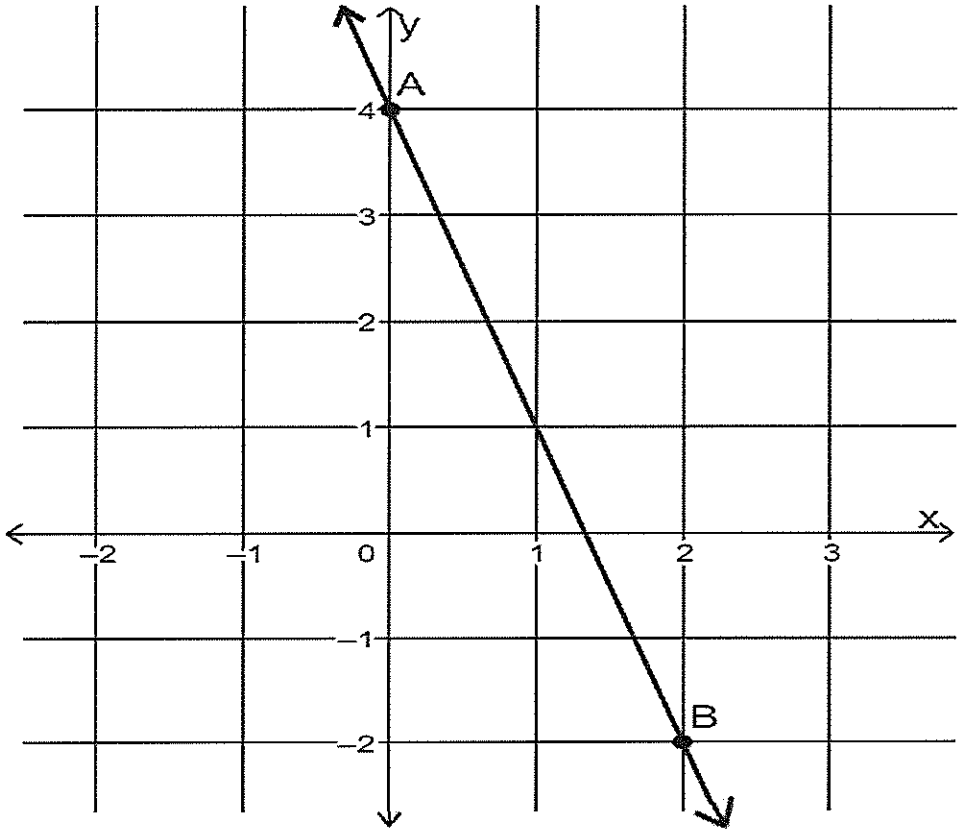
(a) Use the following PAYG tax table to determine the amount of PAYG tax withheld each pay. **1**

Fortnightly earnings ($)	PAYG tax withheld ($)
1960-1965	352
1966-1971	354
1972-1977	356
1978-1983	358
1984-1987	360
1988-1993	362
1994-1998	364

(b) Calculate Daniel's fortnightly net pay. **1**

***(14)** Peter wishes to invest $32,400 at 3.6% p.a. simple interest. Calculate the number of months it will take for the total amount of the investment to reach $35,600. **3**

(15) The following diagram is **not** to scale.



For the diagram above:

(a) Calculate the gradient of the line. **1**

(b) Write the equation of the line in the form $y = mx + b$ **2**

(c) Write the coordinates of the midpoint of AB. **2**

(d) Calculate the distance between A and B, to one decimal place. **2**

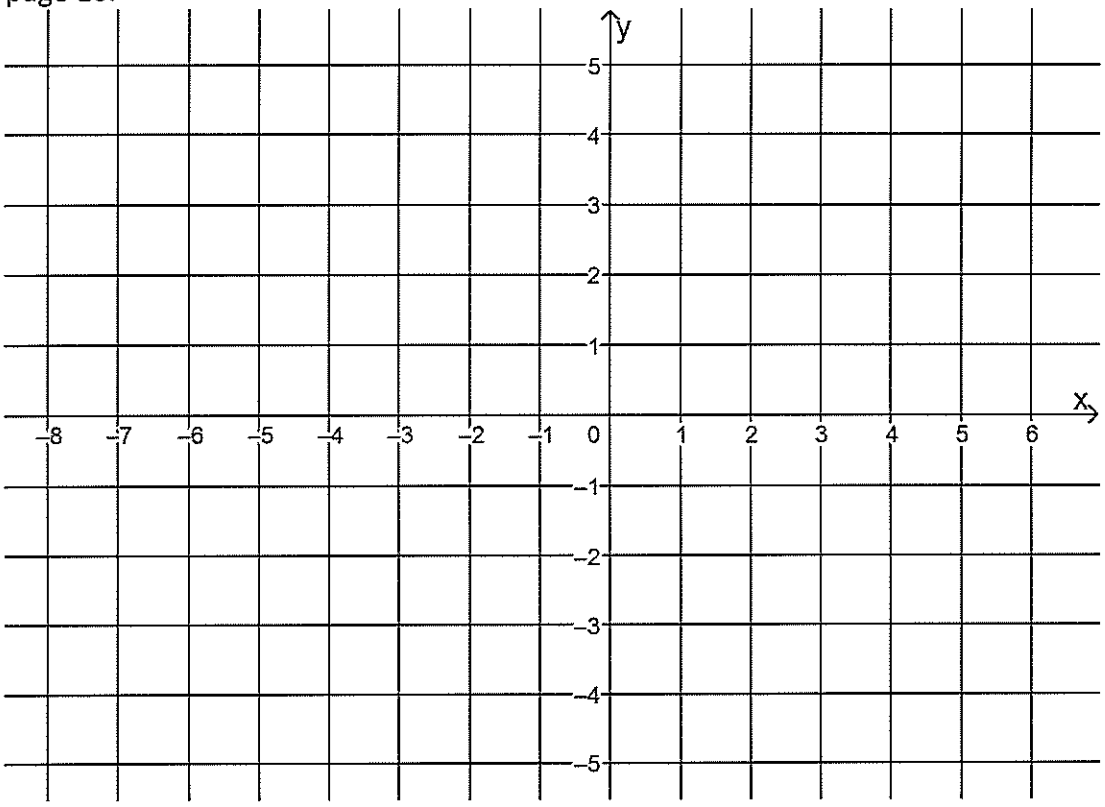
(16) Show that $(-2,13)$ lies on the line $y = -3x + 7$. **1**

(17) A line has a gradient of 4 and passes through the point $(1, -3)$. Write the equation of this line. **2**

(18) Consider the equation $x - 2y + 6 = 0$.

(a) Rearrange the equation into the form $y = mx + b$. **2**

(b) Graph the equation, clearly marking the x- and y-intercepts. A spare graph is provided on page 10. **2**

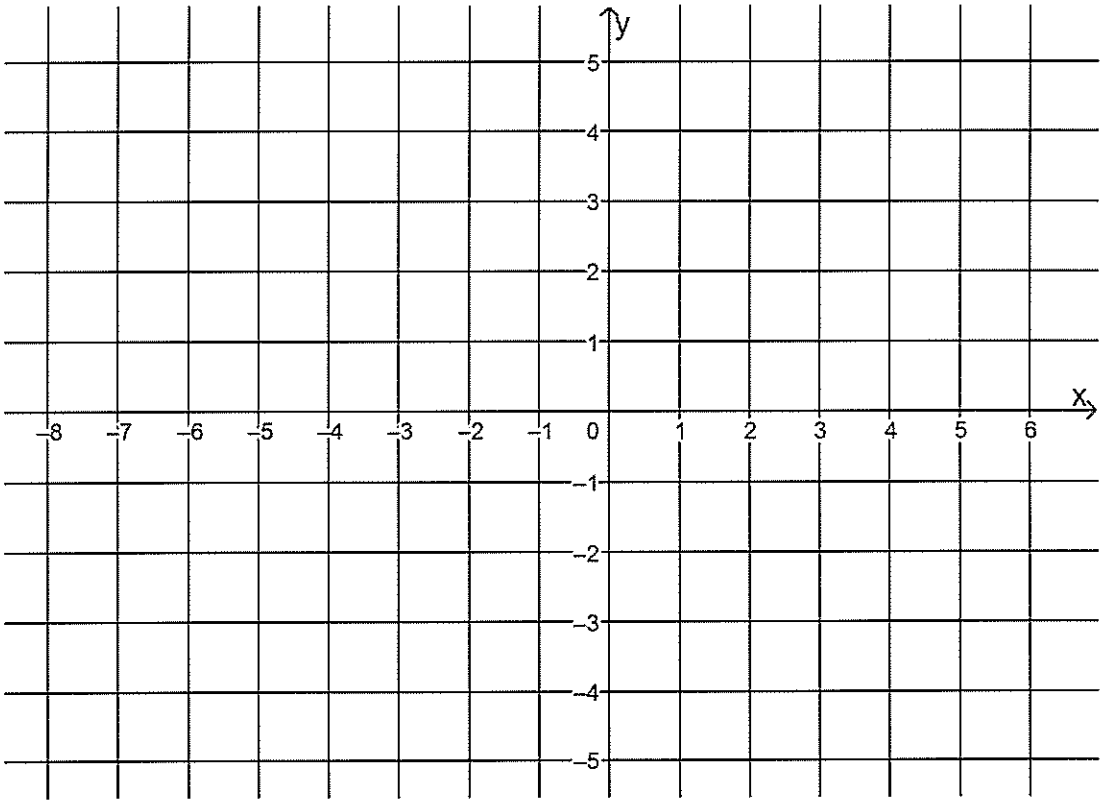


***(19)** The length of an interval CD is 10 units. The coordinates of C are $(-5, y)$ and the coordinates of D are $(1,6)$. Calculate the value of y. **2**

***(20)** The midpoint of an interval MN is $(5, -3)$. The coordinates of M is $(12, 7)$. Find the coordinates of N. **2**

End of Exam

Spare graph for Question 18(b)



Carlingford High School

Mathematics

Year 9 5.2 Term 1 Examination
2018

Name: Sample Solutions + Marking Criteria

Circle your teacher's name:

Mrs Lobejko Mrs Lego/Wilson Mr Wilson Miss Aung

Time allowed: 50 minutes

- Show all necessary working.
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Total	**/7**	**/27**	**/18**	**/52**

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Literacy Component

Mark

(1) Use 7 of the following words to fill in the blanks below. **7**

Interval	Commission	Gross	Salary	Gradient
Net	Linear	Wage	Midpoint	Principal

(a) The graph of a linear equation is a straight line.

(b) A salary is a fixed yearly income.

(c) An interval is a part of a line with definite length.

(d) Income that is usually calculated on the number of hours worked is called a wage.

(e) The principal is the amount of money invested or borrowed, on which interest is given or charged.

(f) Gross pay is the total amount a person earns before deductions.

(g) The steepness of a line is called the gradient.

*1 mark each. Correct spelling required.

Mark

Note: In this exam, assume there are 365 days in year, and 52 weeks in a year.

(2) Find the simple interest earned on an investment of $15,000 at 4% p.a. for 5 years. **2**

$I = PRN$

$= 15000 \times 0.04 \times 5$ (1) attempt to substitute value into simple interest formula

$= \$3000$ (1)

(3) Mita works in a café and earns $21.50 per hour. She works a 36-hour week. Calculate Mita's earnings from the café for one week. **1**

Earnings $= \$21.50 \times 36$

$= \$774$ (1)

(4) Lola earns $12.40 for each lawn that she mows. How many lawns will Lola have to mow to earn exactly $434? **1**

$\$434 \div \$12.40 = 35$ (1)

Lola will have to mow 35 lawns to earn exactly $434.

(5) Christopher earns 3.5% on the value of laptops that he sells. How much will Christopher earn if he sells $12,000 worth of laptops in one week? **1**

Earn $= \$12000 \times 0.035$

$= \$420$ (1)

(6) Frank earns $1,104 a week. He receives an annual leave loading of 17.5% on 4 weeks of pay. Calculate Frank's total pay for a 4-week holiday. **3**

Normal Pay $= 4 \times \$1104$

$= \$4416$ (1)

Leave Loading $= \$4416 \times 0.175$

$= \$772.80$ (1)

Total pay $= \$4416 + \$772.80$

$= \$5188.80$ (1)

8

(7) Selina worked a 45-hour week. She is paid according to the following structure: **3**

Normal rate = $18.70	
Normal rate	For the first 37 hours
Time-and-a-half	For the next 5 hours
Double Time	For each additional hour

(1) correct break down of hours

(1) appropriate use of overtime multipliers.

(1) correct total pay

Calculate Selina's pay for the week.

Pay @ normal rate = $37 \times \$18.70 = \$691.90$

Pay @ time-and-a-half = $5 \times 1.5 \times \$18.70 = \$140.25$

Pay @ double time = $3 \times 2 \times \$18.70 = \$112.20$

Total pay = $\$691.90 + \$140.25 + \$112.20 = \$944.35$

(8) Devita earns a salary of $3,448.08 per fortnight. Calculate the amount that Devita earns per month. **1**

Per month = $3448.08 \times 26 \div 12$

$= \$7470.84$ (1)

(9) In one week, Andrew was paid $1,215 for working 24 hours at normal time and 5 hours at time-and-a-half. Calculate his hourly rate of pay. **2**

Equivalent hours = $24 + (5 \times 1.5)$

$= 31.5$ (1)

Rate of pay = $\$1215 \div 31.5$

$= \$38.57$ (1)

(10) Olga bought a surfboard for $1,300. She sold it for $980. Calculate:

(a) The loss. **1**

Loss = $\$1300 - \$980$

$= \$320$ (1)

(b) The percentage loss, to one decimal place. **1**

Percentage loss = $\frac{\$320}{\$1300} \times 100\%$

$= 24.6\%$ (1)

(11) Jim paid his plumber $210, which included GST. How much GST was paid? 1

$210 \div 11 = \$19.09$ (1)

(12) Jacinta earns **$42,611** a year. She has allowable deductions of **$328** for travel expenses and **$195** for uniform dry-cleaning.

(a) Calculate Jacinta's taxable income. 1

Taxable Income $= \$42611 - \$328 - \$195$

$= \$42088$ (1)

(b) Calculate the income tax payable, using the following tax 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 – $87,000	$3,572 plus 32.5c for each $1 over $37,000
$87,001 – $180,000	$19,822 plus 37c for each $1 over $87,000
$180,001 and over	$54,232 plus 45c for each $1 over $180,000

Tax payable $= \$3572 + [(42088 - 37000) \times 0.325]$ (1)

$= \$3572 + (5088 \times 0.325)$

$= \$3572 + \$1653.6$

$= \$5225.60$ (1)

(c) Throughout the year, Jacinta paid $5,980 in PAYG tax. Is Jacinta entitled to a tax refund or is she liable to pay more tax? Justify your answer with calculations. 2

PAYG tax paid is more than tax payable, therefore refund.

$\$5980 - \$5225.60 = \$754.40$

Refund of $754.40

(1) (1)

6

(13) Daniel earns a salary of **$51,635** and is paid fortnightly. Each pay, **PAYG tax** is deducted, along with **$26.50** for private health insurance and **$40** for superannuation.

(a) Use the following PAYG tax table to determine the amount of PAYG tax withheld each pay. **1**

Fortnightly earnings ($)	PAYG tax withheld ($)
1960-1965	352
1966-1971	354
1972-1977	356
1978-1983	358
1984-1987	360
1988-1993	362
1994-1998	364

Fortnightly earning = $51635 ÷ 26 = $1985.96

∴ PAYG tax withheld = $360 (1)

(b) Calculate Daniel's fortnightly net pay. **1**

Net pay = $1985.96 − $360 − $26.50 − $40
= $1559.46 (1)

***(14)** Peter wishes to invest $32,400 at 3.6% p.a. simple interest. Calculate the number of months it will take for the total amount of the investment to reach $35,600. **3**

$A = I + P$

$35600 = I + 32400$

$I = 3200$ (1)

$I = PRN$

$3200 = 32400 \times 0.036 \times n$

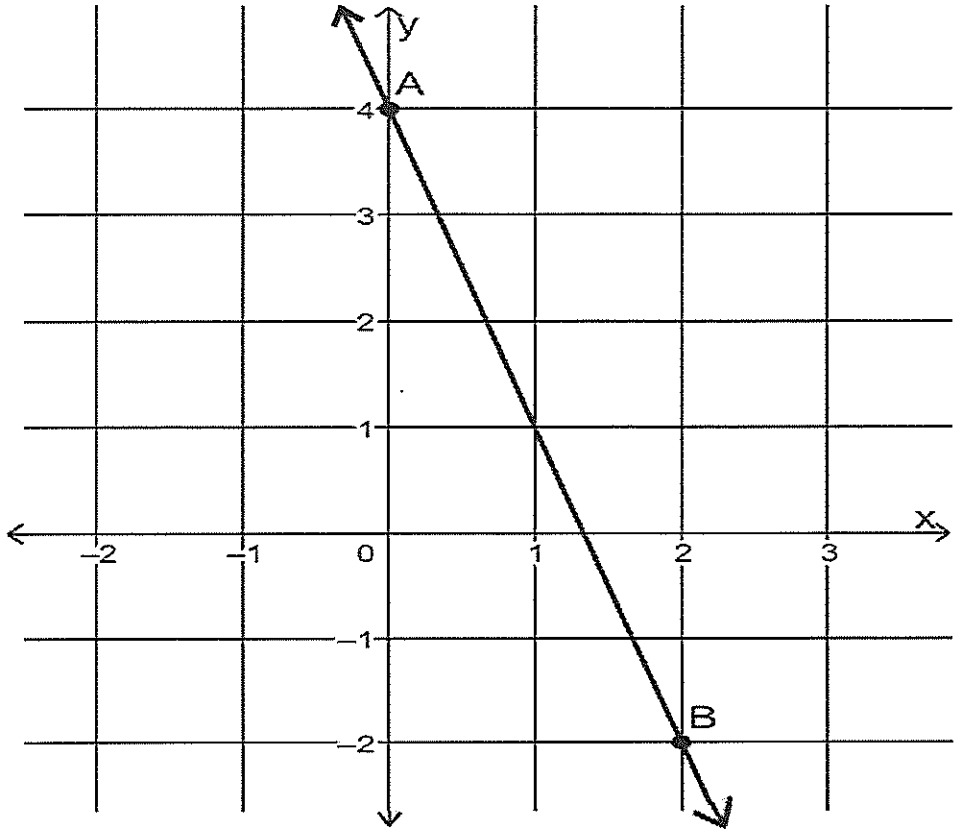
$n = \frac{3200}{32400 \times 0.036}$

$n = 2.743484225$ years (1)

∴ $2.743484225 \times 12 = 32.9218107$ months.

∴ 33 months needed (1)

(15) The following diagram is **not** to scale.



For the diagram above:

(a) Calculate the gradient of the line. **1**

$m = \frac{-6}{2} = -3$ (1)

(b) Write the equation of the line in the form $y = mx + b$ **2**

$b = 4$ (1)

$\therefore y = -3x + 4$ (1)

(c) Write the coordinates of the midpoint of AB. **2**

$M = \left(\frac{0+2}{2}, \frac{-2+4}{2}\right)$

$= (1, 1)$

(1) – appropriate use of the midpoint formula, diagram, or average concept.

(1) – correct answer in co-ordinate form

(d) Calculate the distance between A and B, to one decimal place. **2**

$AB^2 = 6^2 + 2^2$ (1) – appropriate use of Pythagoras' Theorem or the distance formula.

$= 36 + 4$

$= 40$

$AB = \sqrt{40}$

$= 6.3$ units. (1)

7

(16) Show that $(-2,13)$ lies on the line $y = -3x + 7$. **1**

(1) $13 = -3(-2) + 7$

$13 = 6 + 7$

$13 = 13$ true $\therefore$ $(-2,13)$ lies on the line.

(17) A line has a gradient of 4 and passes through the point $(1,-3)$. Write the equation of this line. **2**

$y = 4x + b$

$-3 = 4(1) + b$ (1) - attempts substitution

$-3 = 4 + b$

$b = -7$

$\therefore$ $y = 4x - 7$ (1)

(18) Consider the equation $x - 2y + 6 = 0$.

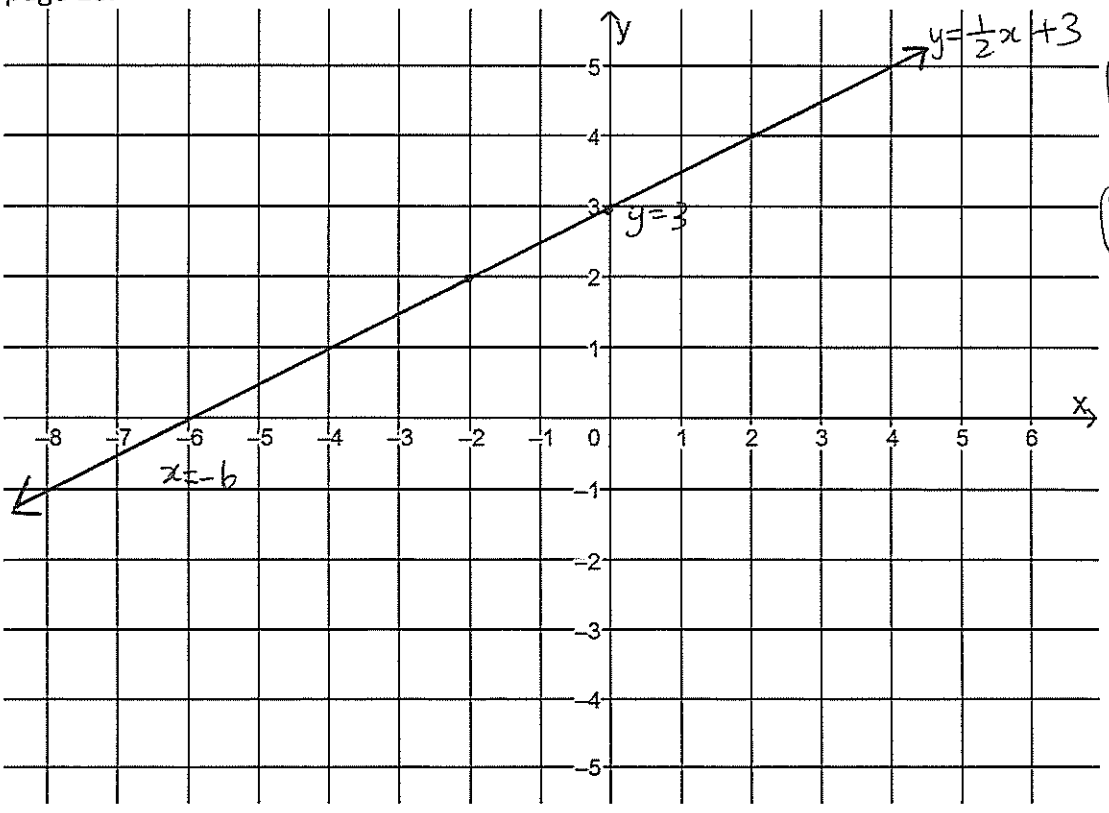
(a) Rearrange the equation into the form $y = mx + b$. **2**

$x + 6 = 2y$ (1) attempts rearranging the equation

$\frac{x+6}{2} = y$

$y = \frac{1}{2}x + 3$ (1)

(b) Graph the equation, clearly marking the x- and y-intercepts. A spare graph is provided on page 10. **2**



(1) correct graph

(1) neat, labelled graph.

7

*(19) The length of an interval CD is 10 units. The coordinates of C are $(-5, y)$ and the coordinates of D are $(1,6)$. Calculate the value of y. **2**

$10 = \sqrt{(-5-1)^2 + (y-6)^2}$

$10 = \sqrt{36 + (y-6)^2}$

$100 = 36 + (y-6)^2$

$64 = (y-6)^2$

$y - 6 = \pm 8$

$\therefore y = 8+6$ or $y = -8+6$

$y = 14$ or $y = -2$

(1) attempts to use Pythagoras' Theorem or the distance formula

(1) one or both correct answers

*(20) The midpoint of an interval MN is $(5, -3)$. The coordinates of M is $(12, 7)$. Find the coordinates of N. **2**

$5 = \frac{12+x_1}{2}$ $\quad -3 = \frac{7+y_1}{2}$

$10 = 12 + x_1$ $\quad -6 = 7 + y_1$

$x_1 = -2$ $\quad y_1 = -13$

(1) attempts to use midpoint formula, or the concept of average.

$\therefore N(-2, -13)$ (1)

End of Exam

Spare graph for Question 18(b)