Carlingford High School

Mathematics

Year 9 5.2 Term 1 Examination 2019

Name: SOLUTIONS

Circle your teacher's name:

Miss Aung **Mr Fardouly/Mrs Blakeley**

Mr Gong **Mrs Lobejko**

Time allowed: 55 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	Financial Mathematics	Algebraic Techniques	Total
Mark	/24	/56	/80

FINANCE

For all finance questions:
1 year = 52 weeks.

1. Charlotte earns time-and-a-half on Saturdays and double time on Sundays. She works 35 hours from Monday to Friday, 8 hours on Saturday and 5 hours on Sunday. Calculate Charlotte's total earnings if her normal rate of pay is $15.40 per hour. **[2 marks]**

$35 \times 15.4 + 8 \times 1.5 \times 15.4$
$+ 5 \times 2 \times 15.4 = \$877.80$

2. Isaiah earns a salary of $3 872.50 per month. How much does Isaiah earn per week? **[1 mark]**

$3872.50 \times 12 \div 52$
$= \$893.65$
($890.57 for 52.18 weeks)

3.* A fitness trainer conducts a class with 12 participants who pay $15 each. The class lasts for 45 minutes. What is the instructor's average hour income? **[2 marks]**

$12 \times 15 = \$180 / 45$ minutes
$180 \div \frac{3}{4} = \$240/h$

4. A real estate agent is paid a monthly retainer of $750 and a commission of 1.5% of the value of properties sold. Her sales in February were $867 400. Calculate her income for February. **[2 marks]**

$750 + 1.5\% \times 867\,400$
$= \$13\,761$

5. Fred earns 85 cents for each toy he assembles. Find the number of toys Fred must assemble to earn (at least) $200. **[2 marks]**

$200 \div 0.85 = 235.294...$
$\therefore$ 236 toys

6. Lily's annual salary is $58 410. Find: **[3 marks]**
(a) Lily's normal weekly pay.

$58410 \div 52 = \$1\,123.27$
($1119.39 for 52.18 weeks)

(b) the annual leave loading of 17.5% on 4 weeks pay.

$17.5\% \times 4 \times 1123.27$
$= \$786.29$

(c) Lily's total pay for the four week holiday.

$4 \times 1123.27 + 786.29$
$= \$5\,279.37$

7. Akiko earns a gross fortnightly salary of $1 235. **[3 marks]**

(a) Calculate her weekly gross pay

1235 ÷ 2 = $617.50

(b) Use the PAYG tax table below to find Akiko's PAYG tax paid per week.

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

PAYG = $172

(c) Each week Akiko also pay $47.56 to her superannuation fund and $26.33 in union fees. Calculate her weekly net pay.

617.50 − 172 − 47.56 − 26.33
= $371.61

8. Yusef earns a salary of $76 400 and other income of $2034. He has allowable deductions of $1655 in travel expenses and $310 in donations to charities. **[2 marks]**

(a) What is Yusef's taxable income?

76400 + 2034 − 1655 − 310
= $76 469

(b) Calculate the 2% Medicare levy Yusef must pay.

2% × 76 469
= $1 529.38

9. Adam has an annual taxable income of $38 600. Use the income tax table below to calculate the amount of income tax Adam must pay. **[1 mark]**

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

3572 + 0.325(38606 − 37000)
= $4 092

10. A car is priced at $20 900.

[2 marks]

(a) Calculate the GST payable

10% × 20 900 = $2090

(b) Find the final price of the car

20900 + 2090 = $22990

11*. A jacket discounted by 30% after Christmas sells for $119. What was the original price of the jacket?

[1 mark]

$\frac{119}{70} \times 100 = \$170$

12. Find the simple interest earned on \$7590 at 2.3% p.a. invested for 8 months. **[1 mark]**

$I = 7590 \times \frac{2.3}{100} \times \frac{8}{12}$

$= \$116.38$

13. After 3 years, an investment of \$2500 has earned \$285 in simple interest. What is the annual interest rate? **[2 marks]**

$285 = 2500 \times R \times 3$

$285 = 7500R$

$R = \frac{285}{7500} \times 100$

$= 3.8\%$

ALGEBRA

14. Write an algebraic expression for each statement: **[4 marks]**

(a) the sum of x and y

$x + y$

(b) 4 less than h

$h - 4$

(c) 6 more than half of k

$\frac{k}{2} + 6$

(d) the average of a, b and c

$\frac{a+b+c}{3}$

15. If $a = 3, b = 7$ and $c = -5$, find the value of each expression: **[6 marks]**

(a) $ab + c$ **[2]**

$3 \times 7 + (-5) = 21 - 5$

$= 16$

(b) $2c^2 - b$ **[2]**

$2 \times (-5)^2 - 7 = 2 \times 25 - 7$

$= 50 - 7$

$= 43$

(c) $\frac{b-c}{a}$ **[2]**

$\frac{7-(-5)}{3} = \frac{7+5}{3}$

$= \frac{12}{3}$

$= 4$

16. Simplify the following: **[2 marks]**

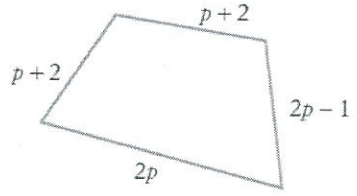
(a) $6x + 2y + 5y - 3x$

$3x + 7y$

(b) $3h^2 + 2h + 9h^2 - 2h^2$

$10h^2 + 2h$

17. Write an expression for the perimeter of the following shape: **[2 marks]**



$p + 2 + 2p - 1 + 2p + p + 2$

$= 6p + 3$ units

18. Simplify the following: **[5 marks]**

(a) $-3m \times 5$

$-15m$

(b) $4h \times 2 \times (-5h)$

$-40h^2$

(c) $(-6k)^2$

$36k^2$

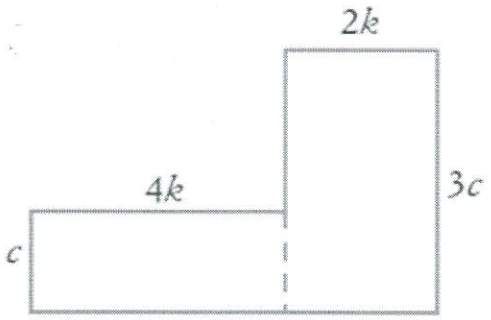
(d) $\frac{32c}{-4}$

$-8c$

(e) $9x \div 45xy$

$\frac{9x}{45xy} = \frac{1}{5y}$

19. Write a simplified algebraic expression for the area of the following shape: **[2 marks]**



Area $= 4k \times c + 2k \times 3c$

$= 4ck + 6ck$

$= 10ck$ units^2

20. Simplify: **[14 marks]**

(a) $\frac{x}{5} + \frac{2x}{5}$ $\frac{3x}{5}$

(b) $\frac{7m}{10} - \frac{3m}{10}$ **[2]**

$\frac{4m}{10} = \frac{2m}{5}$

(c) $\frac{2k}{5} + \frac{m}{6}$ **[2]**

$\frac{12k}{30} + \frac{5m}{30} = \frac{12k+5m}{30}$

(d) $\frac{v}{5} \times \frac{2}{3}$ $\frac{2v}{15}$

(e) $\frac{5x}{6y^2} \times \frac{2y}{15}$ **[2]** $\frac{x}{9y}$

(f) $\frac{q}{4} \div \frac{3}{4}$ **[2]**

$\frac{q}{4} \times \frac{4}{3} = \frac{q}{3}$

(g) $\frac{xh}{5} \div \frac{3h}{15}$ **[2]**

$\frac{xh}{5} \times \frac{15^3}{3h} = \frac{3x}{3}$

$= x$

(h) $\frac{d}{3} \div \frac{5s}{2} \times \frac{3d}{7}$ **[2]**

$= \frac{d}{3} \times \frac{2}{5s} \times \frac{3d}{7}$

$= \frac{2d^2}{35s}$

21. Expand: **[3 marks]**

(a) $5(m-7)$

$5m - 35$

(b) $3x(4y+7x)$

$12xy + 21x^2$

(c) $-y(y+5)$

$-y^2 - 5y$

22. Expand and simplify by collecting like terms: **[4 marks]**

(a) $5(2y+6)+4y$ **[2]**

$= 10y + 30 + 4y$

$= 14y + 30$

(b) $2w(3w-8)-4(2w-7)$ **[2]**

$= 6w^2 - 16w - 8w + 28$

$= 6w^2 - 24w + 28$

23. Factorise: **[4 marks]**

(a) $9n+27$

$9(n+3)$

(b) $-18j+12$

$-6(3j-2)$

(c) $28gh^2 - 35g^2h$

$7gh(4h-5g)$

(d*) $5(a+7)-b(a+7)$

$(a+7)(5-b)$

24. Expand and simplify: **[6 marks]**

(a) $(t+3)(t-9)$ **[2]**

$= t(t-9) + 3(t-9)$

$= t^2 - 9t + 3t - 27$

$= t^2 - 6t - 27$

(b) $(m+3)(5-m)$ **[2]**

$= m(5-m) + 3(5-m)$

$= 5m - m^2 + 15 - 3m$

$= -m^2 + 2m + 15$

(c) $(2a-5)(3a+6)$ **[2]**

$= 2a(3a+6) - 5(3a+6)$

$= 6a^2 + 12a - 15a - 30$

$= 6a^2 - 3a - 30$

25*. A rectangular garden bed has a length of 3m and a width of 2m. The length is to be increased by x m and the width is to be increased by y m. **[4 marks]**

(a) Write an expression for the new length of the garden bed.

$3 + x$ metres

(b) Write an expression for the new width of the garden bed.

$2 + y$ metres

(c) Hence find a simplified expression for the new area of the garden bed. **[2]**

Area $= (3+x)(2+y)$

$= 6 + 3y + 2x + xy$ m^2

END OF EXAM