LW/JY

Financial Mathematics (31 marks)

For all calculations, use 1 year = 52 weeks

1. Calvin is paid $41.50 for each 500 leaflets, or part thereof, he delivers. Calculate his pay for delivering 2300 leaflets.

   A. $95 450 B. $166.00
   C. $190.90 D. $207.50

2. Which of the following people earns the most?

   A. Barbara gets $485 per week.
   B. Margaret gets $1010 per fortnight.
   C. Tina gets $2130 per month.
   D. Alice gets $26 200 per annum.

3. Gertrude sells internet plans. She is paid a weekly retainer of $150 and the following rates of commission:

   - 2% of the first $20 000 worth of sales,
   - 3.5% of any sales above $20 000.

   Calculate how much Gertrude earns in a week in which her sales are $25 000. [3]

   $20000 \times 2\% = \$400$ (1)

   $5000 \times 3.5\% = \$175$ (1)

   Earnings $= \$150 + \$400 + \$175$

   $= \$725$ (1)

4. What amount, to the nearest whole number, must be invested now at 4% per annum, compounded quarterly, so that in five years it will have grown to $61000? [3]

   $A = P(1+r)^n$

   $61\,000 = P\left(1 + \frac{4}{4}\%\right)^{5\times 4}$ (1)

   $P = \frac{61\,000}{(1+4/4\%)^{20}}$

   $= \$49992.21$ (1)

   ∴ Needs to invest $49993. (1)

5. Ebony earns $17.20 per hour at the normal rate. Each week, Ebony works for 11 hours at the normal rate and 4 hours at time-and-a- half.

   a) What is Ebony's wage each week? [2]

   Normal $= \$17.20 \times 11$
   $= \$189.20$

   Overtime $= \$17.20 \times 1.5 \times 4$
   $= \$103.20$

   either (1)

   Total Wage $= \$292.40$ (1)

   b) Ebony wants to increase her weekly wage to $430 by working extra hours at the normal rate. How many extra hours must she work? [2]

   Extra $= 430 - 292.40$
   $= \$137.60$ (1)

   Hours $= \$137.60 \div \$17.20$

   $= 8$ hours (1)

LW | J4

6. Paul is a chemist who earns an annual salary of $58 762. He is entitled to 4 weeks of annual leave, for which he is paid his normal amount plus $17\frac{1}{2}\%$ annual leave loading.

a) Calculate Paul's salary for a 4-week period. [1]

4 weeks pay = $58762 ÷ 52 × 4
= $4520.15

b) Calculate how much holiday loading Paul will receive for the 4-weeks annual leave. [1]

loading = $4520.15 × 17.5%
= $791.03

c) What is Paul's total holiday pay for the 4 weeks period? [1]

Total pay = $4520.15 + $791.03
= $5311.18

7. Ariana is charged compound interest at the rate of 0.036% per day on outstanding credit card balances. She has $780 outstanding for 24 days.

How much compound interest is she charged?

A. $6.74 (B.) $6.77
C. $786.74 D. $786.77

8. Susan earns a gross pay of $2290.33 per fortnight. Her deductions are for PAYG tax, $54.10 for superannuation and $40.30 for union fees.

a) Use the table below to find Susan's PAYG tax per fortnight. [1]

Fortnightly earnings ($)	PAYG tax withheld ($)
2274–2279	450
2280–2285	452
2286–2291	454
2292–2297	456
2298–2303	458
2304–2309	460

$454

b) Calculate Susan's net pay. [1]

Net = $2290.33 − $454
− $54.10 − $40.30

= $1741.93

c) Calculate Susan's total deductions as a percentage of her gross income, correct to one decimal place. [2]

deductions = $454 + $54.10
+ $40.30

= $548.40 (1)

$\frac{\$548.40}{\$2290.33} \times 100$

= 23.9% (1)

VL

9. Alice earns an annual salary of $55 000 as a hairdresser. She also earns $5400 from selling handbags. Her allowable tax deductions are union fees of $700, $560 for uniforms and superannuation contributions of $1880. Her employer deducts $175 per week for tax. Medicare Levy is charged at 2%.

a) What is the total of all her allowable deductions. [1]

Deductions = $700 + $560 + $1880
= $3140

b) What is Alice's taxable income? [1]

taxable income = $55000 + $5400 − $3140
= $57260

c) Find the amount of Medicare Levy Alice has to pay. [1]

57260 × 2%
= $1145.20

d) Using the tax table on the bottom of this page, find her tax payable. [2]

3572 + 0.325(57260 − 37000)
= $10156.50

e) Calculate Alice's total tax for the year. [1]

total = $10156.50 + $1145.20
= $11301.70

f) Will Alice receive a refund or a debt? Justify your answer with appropriate calculations. [2]

tax paid = $175 × 52
= $9100

debt = $11301.70 − $9100
= $2201.70

Taxable income	Tax payable
0 - $18 200	Nil
$18 201 - $37 000	Nil + 19 cents for each $1 over $18 200
$37 001 - $80 000	$3572 + 32.5 cents for each $1 over $37 000
$80 001 - $180 000	$17 547 + 37 cents for each $1 over $80 000
$180 001 and over	$54 547 + 45 cents for each $1 over $180 000

VL

10. Dominic plans to make an investment of $200 000 at 9.75% p.a. simple interest for 15 months.	**Working out**
a) How much simple interest will Dominic earn? [2]	
$I = Prn$ $= 200\,000 \times 9.75\% \times \frac{15}{12}$ (1) $= \$24\,375$ (1)	
b) How much will Dominic's investment be worth at the end of the term? [1]	
$Total = \$200\,000 + \$24\,375$ $= \$224\,375$	

VL

PW

Algebraic Expressions (30 marks)

1. $7ab + 2b - 5ab + b$ simplifies to:

A. $2ab + 2b^2$ (B.) $2ab + 3b$
C. $2ab + b$ D. $5ab$

2. $3x^3y \times 2x^5y^3$ is equal to:

A. $5x^{15}y^3$ B. $6x^{15}y^3$
(C.) $6x^8y^4$ D. $5x^8y^4$

3. $12a^7 \div 4a^4$ simplifies to:

(A.) $3a^3$ B. $3a^{11}$
C. $8a^3$ D. $8a^{11}$

4. Simplify $\frac{6a^7b^3}{3a^2b^8}$

(A.) $\frac{2a^5}{b^5}$ B. $\frac{b^5}{2a^3}$

C. $\frac{2a^3}{b^5}$ D. $\frac{a^5}{2b^3}$

5. $(x-4)(x+5)$ expands to:

(A.) $x^2 + x - 20$ B. $x^2 + x - 9$
C. $x^2 - 9x - 20$ D. $x^2 + 9x + 20$

6. Simplify each expression fully:

a) $3mn \times 2m \times -10$ [1]

$-60m^2n$

b) $45a^2b^2c^2 \div 5abc \div 3$ [2]

$3abc$

9abc 1 mark

7. Expand and simplify fully the following:

a) $3w\,(7w - 2t)$ [1]

$21w^2 - 6tw$

b) $-(4m - 9)$ [1]

$-4m + 9$

c) $2(3x + 3) - 4(x + 5)$ [2]

$= 6x + 6 - 4x - 20$ (1)

$= 2x - 14$ (1)

d) $(2r + 7)^2$ [2]

$= 4r^2 + 28r + 49$

e) $4 - (x - 3)(x + 2)$ [2]

$= 4 - [x^2 - x - 6]$ (1)

$= 4 - x^2 + x + 6$

$= 10 - x^2 + x$ (1)

f) $(\frac{2}{y} - y)^2$ [2]

$= \frac{4}{y^2} - 2(\frac{2}{y} \times y) + y^2$ (1)

$= \frac{4}{y^2} - 4 + y^2$ (1)

PW

8. Simplify fully the following:

a) $\frac{5t}{8} - \frac{3t}{5}$ [2]

$= \frac{25t - 24t}{40}$ (1)

$= \frac{t}{40}$ (1)

c) $\frac{3c}{4d} \div \frac{12c}{10d} \times \frac{d^2}{5c^3}$ [2]

$= \frac{3\cancel{c}}{4\cancel{d}} \times \frac{\overset{2}{\cancel{10}}\cancel{d}}{\underset{2}{\cancel{12}}\cancel{c}} \times \frac{d^2}{5c^3}$ (1)

$= \frac{d^2}{8c^3}$ (1)

9. Factorise each expression completely:

a) $8xy - 24y$ [1]

$= 8y(x - 3)$

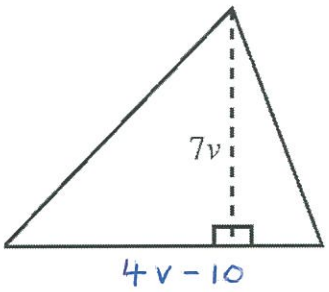
b) $-15m - 45m^2 - 5m^3$ [1]

$= -5m(3 + 9m + m^2)$

c) $m(3n + p) - r(3n + p)$ [1]

$= (3n + p)(m - r)$

10. Find, in simplest form, an expression for the area of the triangle below. [2]



$A = \frac{1}{2}(4v - 10) \times 7v$

$= \frac{1}{\cancel{2}} \times \cancel{2}(2v - 5) \times 7v$

$= 7v(2v - 5)$

1 mark $\frac{7v}{2}(4v - 10)$

11. $(y - 2)(3y + 1) - (y - 7)^2$ [3]

$= 3y^2 - 6y + y - 2 - (y^2 - 14y + 49)$ (1)

$= 3y^2 - 6y + y - 2 - y^2 + 14y - 49$ (1)

$= 2y^2 + 9y - 51$ (1)