Topic Test: Financial Mathematics

Total time allowed: 45 minutes **Total marks:** 35

1 $500 invested for 2 years at 10% simple interest p.a. becomes:

A $550 B $600
C $625 D $650

2 $2000 invested for 2 years at 10% compound interest becomes:

A $2400 B $2420
C $2666 D $5000

3 Amber is paid $9.50 per hour for the first 36 hours and is paid time-and-a-half for every extra hour worked. How much is she paid for 41 hours?

A $389.50 B $413.25
C $460.75 D $584.25

4 Lauren is employed as a seasonal worker at a vineyard. She is paid $4.75 per box of grapes picked. During 1 week Lauren picked the following number of boxes:

Monday	24
Tuesday	27
Wednesday	31
Thursday	22
Friday	25

The amount Lauren earned from picking grapes during this week is:

A $129 B $612.75
C $516 D $857.75

5 Paul works as a machinery importer and earns $1560 per week. If holiday loading is 17.5% of 4 weeks pay, the total amount of holiday pay Paul earns over his 4 weeks annual leave is:

A $273 B $1092
C $6513 D $7332

6 Joel works in real estate and is paid the following commission: 5% on the first $250 000, 3% on the next $650 000, and 2.5% thereafter. The total commission charged by Joel for selling a property worth $1.4 million is:

A $7000 B $35 000
C $44 500 D $70 000

7 A sum of $800 amounted to $832 after 6 months at simple interest. What rate of interest was earned?

A 6% B 7%
C 8% D 9%

8 Judy owns a café and earns $2400 per week gross pay. If her superannuation contribution is $150, union fees are $25 and tax is $85, Judy's net pay is:

A $2400 B $2315
C $2290 D $2140

9 Part of Bob's monthly budget is shown below:

Expenses	$
Mortgage	4550
Electricity and gas	250
Mobile and internet	89
Clothes and entertainment	210
Transport	356
Food	435
Miscellaneous expenses	760
Savings	?
Total	**8053**

The amount of money he saves each week is:

A $350.75 B $323.77
C $1403 D $1662.50

10 Tim has a taxable income of $106 000 p.a. and is required to pay a Medicare levy of 1.5% of taxable income. The amount paid each fortnight to cover the Medicare levy is:

A $1590 B $30.58
C $61.15 D $132.50

11 Building costs are rising at 20% every 6 months. If a house costs $90 000 to build now, how much will it cost to build the same type in 12 months' time?

A $93 900 B $99 600
C $124 600 D $129 600

12 Mitchell invests $500 for 3 years at 4.5% p.a., compounding quarterly. The amount of interest Mitchell earns after 3 years is:

A $70.58 B $71.84

C $570.58 D $571.84

13 The future value of a fixed investment of $25 000 at 8% p.a. after n years is given by $A = P(1.08)^n$. Find the future value correct to the nearest dollar if $n = 5$.

A $27 834 B $31 935

C $36 733 D $63 753

14 Mary invests in a block of land and pays $28 000. It increases in value by 7.5% of the previous year's value. How much is the land worth at the end of 2 years?

A $30 061 B $32 358

C $36 483 D $63 853

15 A sales agent on a yearly salary of $58 500 is paid on a monthly basis. In December she gets the normal monthly salary plus a bonus of 2% of the yearly salary. How much does she receive in December?

A $4945 B $4875

C $5965 D $6045

16 Alexis receives a gross wage of $625.80 for a 35-hour week.

a Calculate Alexis' hourly rate of pay. 1 mark

b During one busy week, in addition to her normal 35 hours, Alexis works the following overtime:

- 4 hours on Thursday night at time-and-a-half
- 4 hours on Saturday at double time.

Find Alexis' gross wage for the week. 1 mark

c Alexis has the following payments deducted from her weekly wage:

- Taxation: 32% of gross weekly wage
- Health insurance: $23.80 per week
- Superannuation: 16 units at $2.50 per unit.

Calculate her net pay for the busy week. 1 mark

17 Use the following tax table to answer the questions below:

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

a Josh's taxable income is $95 000. Calculate the amount of tax he must pay. 1 mark

b If the Medicare levy is 1.5% of taxable income, calculate the amount Josh needs to pay to cover the levy. 1 mark

c If Josh pays $552 in weekly PAYE tax instalments throughout the year, calculate his tax owing or tax refund at the end of the financial year. 1 mark

18 Yvette is a real estate agent and is paid an annual salary of $75 000, plus a commission of 2% on all sales. She is also paid a car allowance of $150 per week. What will be her total yearly income if she sells property worth $2 400 000? 1 mark

19 Allen and Susan obtain a personal loan from a bank to purchase a boat. The price of the boat is $12 600 and they have saved $4000 as a deposit. The bank gives them a loan for the balance to be repaid over 3 years in equal monthly instalments. Interest is charged at 8% per annum flat.

a Calculate the total amount they pay for the boat. 1 mark

b Find the monthly instalments. 1 mark

20 a Chelsea pays $341 for dinner at a restaurant for six people. How much GST is included in the bill? 1 mark

b Tori has been asked to sing at a function and will earn $75 per hour plus GST of 10%. If she performs for $2\frac{1}{2}$ hours, what is the total amount Tori will be paid? 1 mark

21 $6500 is invested into an account earning interest of 4.8% p.a., compounded quarterly. If no other deposits are made into the account, how much will be in the account at the end of 3 years? 1 mark

22 Amelia is looking at moving onto campus when she commences study at university and estimates her weekly living costs will be $580. Which of the jobs listed below should she take so she can cover her estimated expenses?

- Job A: Part-time retail job paying $30 000 per year
- Job B: Casual office job paying $30.75 per hour (20 hours of work per week)
- Job C: Part-time hospitality job paying $2375 per month. 1 mark

23 The table below shows the compounded value of $1. Use it to answer the following questions.

Years	5%	6%	7%	8%	9%	10%
1	1.050	1.060	1.070	1.080	1.090	1.100
2	1.103	1.124	1.145	1.166	1.188	1.210
3	1.158	1.191	1.225	1.260	1.295	1.331
4	1.216	1.262	1.311	1.360	1.412	1.464
5	1.276	1.338	1.403	1.469	1.539	1.611

a If $3000 is invested at 6% p.a. compounding annually, how much will it be worth in 4 years? 1 mark

b How much interest has it earned? 1 mark

24 Michelle is planning a 4-week holiday that she estimates will cost $2000. If Michelle earns $489 a week after tax from her job at a nursing home and is paid 17.5% holiday loading for 4 weeks pay, calculate:

a the amount of holiday loading she will be paid 1 mark

b Michelle's total amount of holiday pay 1 mark

c how much extra spending money Michelle will have after she has paid the expected cost of her holiday. 1 mark

25 The following table outlines some of the Youth Allowance government-pension payments available in a given year to eligible students:

Your circumstances	Your maximum fortnightly payment
Single, with no children, under 18 years, and living at parental home	$226.80
Single, with no children, under 18 years, and required to live away from parental home to study, undertake training or look for work	$414.40
Single, with no children, 18 years or more, and living at parental home	$272.80
Single, with no children, 18 years or more, and required to live away from parental home	$414.40

a Nineteen-year-old Harry is a full-time university student living on campus who is eligible for Youth Allowance. Assuming Harry qualifies for the maximum fortnightly payment, what will Harry's annual Youth Allowance pension amount be? 1 mark

b Harry's sister Molly is 17 years old and lives at her parental home while studying at school. Assuming Molly qualifies for the maximum fortnightly payment, what will her weekly Youth Allowance pension amount be? 1 mark

1 $I = Prn = 500 \times 0.1 \times 2$
$= \$100$
Total amount $= \$500 + \$100$
$= \$600$ ✓

2 Total amount $= P(1 + r)^n$
$= 2000(1 + 0.1)^2$
$= \$2420$ ✓

3 Total amount paid $= 36 \times \$9.50 + 5 \times 1.5 \times \$9.50$
$= \$342 + \$71.25$
$= \$413.25$ ✓

4 $(24 + 27 + 31 + 22 + 25) \times \$4.75 = 129 \times \$4.75$
$= \$612.75$ ✓

5 Holiday loading $= 17.5\% \times 4 \times 1560$
$= \$1092$

Holiday pay = Loading + Regular pay
$= 1092 + (4 \times 1560)$
$= \$7332$ ✓

6 Commission $= 5\% \times 250\,000 + 3\% \times 650\,000 + 2.5\%$
$\times (1\,400\,000 - 250\,000 - 650\,000)$
$= \$44\,500$ ✓

7 Interest earned in 6 months $= \$32$

$$I = Prn$$
$$32 = 800 \times r \times \frac{1}{2}$$
$$32 = 400r$$
$$0.08 = r$$
$$\therefore r = 8\%$$ ✓

8 Judy's Net pay = Gross pay − Deductions
$= 2400 - (150 + 25 + 85)$
$= \$2140$ ✓

9 Weekly savings = Monthly savings × 12 ÷ 52
$= (8053 - 4550 - 250 - 89 - 210 - 356$
$- 435 - 760) \times 12 \div 52$
$= 323.7692\ldots$ [Cal.]
$= \$323.77$ ✓

10 Fortnightly Medicare levy $= 1.5\% \times 106\,000 \div 26$
$= 61.1538\ldots$ [Cal.]
$= \$61.15$ ✓

11 $r = 20\%$ per period
$n = 2$ periods
$P = \$90\,000$
$A = P(1 + r)^n$
$A = 90\,000(1 + 0.2)^2$
$= 90\,000(1.2)^2$
$= \$129\,600$ ✓

12 Interest = Final amount − Principal

$$= 500\left(1 + \frac{4.5\%}{4}\right)^{3\times4} - 500$$

$= 571.8372\ldots$ [Cal.] $- 500$
$= \$71.84$ ✓

13 $A = P(1.08)^n$
$= 25\,000(1.08)^5$
$= \$36\,733.201\,92$ [Cal.]
$= \$36\,733$ [to nearest dollar] ✓

14 Total amount $= P(1 + r)^n$
$= 28\,000(1 + 0.075)^2$
$= \$32\,357.50$
$= \$32\,358$ [to nearest dollar] ✓

15 One month's salary $= \$58\,500 \div 12$
$= \$4875$
2% of annual salary $= \$1170$
Total amount paid $= \$4875 + \$1170$
$= \$6045$ ✓

16 a Hourly rate $= \$625.80 \div 35$
$= \$17.88$ ✓

b Alexis' gross wage for the week
$= [\$625.80 + (4 \times \$17.88 \times 1.5) + (4 \times \$17.88 \times 2)]$
$= \$876.12$ ✓

c Taxation = 32% of \$876.12
$= 32\% \times \$876.12$
$= \$280.36$ [to nearest cent]
Superannuation $= 16 \times \$2.50$
$= \$40$
Health insurance = \$23.80 per week
Total deductions $= \$280.36 + \$40 + \$23.80$
$= \$344.16$
Alexis' net pay $= \$876.12 - \$344.16$
$= \$531.96$ ✓

17 a Tax owed $= \$17\,547 + \frac{37}{100} \times (95\,000 - 80\,000)$
$= \$23\,097$ ✓

b Medicare levy $= 1.5\% \times 95\,000$
$= \$1425$ ✓

c Tax paid $= 52 \times \$552$
$= \$28\,704$
Since tax paid (including the Medicare levy) > tax owed, Josh will receive a refund of
$\$28\,704 - (\$23\,097 + \$1425) = \$4182$. ✓

18 Annual salary = \$75 000
Commission = 2% of \$2 400 000
$= 2\% \times \$2\,400\,000$
$= \$48\,000$
Car allowance $= \$150 \times 52$
$= \$7800$
Total yearly income $= \$75\,000 + \$48\,000 + \$7800$
$= \$130\,800$ ✓

19 a Price of the boat = \$12 600
Deposit = \$4000
Amount borrowed = \$12 600 − \$4000
= \$8600
Interest charged at 8% flat in 3 years
= 8% × \$8600 × 3
= \$2064
Total amount paid = \$4000 + \$8600 + \$2064
= \$14 664 ✓

b Monthly payment

$$= \frac{\$8600 + \$2064}{36}$$

$$= \frac{\$10\,664}{36}$$

= \$296.22 [to nearest cent] ✓

20 a The bill represents 100% of the cost + 10% GST.
110% = \$341
10% = 341 ÷ 11
= 31
Therefore the bill included \$31 GST. ✓

b Tori's earnings = \$75 × 2.5 + 10% × \$75 × 2.5
= \$206.25 ✓

21 $A = P(1 + r)^n$
The account is compounding quarterly, so $r = \frac{4.8\%}{4}$ and $n = 3 \times 4$
$A = 6500(1 + 1.2\%)^{12}$
= 7500.3150... [Cal.]
= \$7500.32 ✓

22 First, each amount must be converted to a weekly amount so they can be compared.
A: Part-time retail job paying \$30 000 per year
= 30 000 ÷ 52 = \$576.92 per week
B: Casual office job paying \$30.75 per hour (20 hours of work per week)
= 30.75 × 20 = \$615 per week
C: Part-time hospitality job paying \$2375 per month
= 2375 × 12 ÷ 52 = \$548.08 per week
Therefore, Amelia should take Job B, the casual office job. ✓

23 a $A = 3000 \times 1.262$
= \$3786 ✓

b Interest = Final amount − Initial amount
= \$3786 − \$3000
= \$786 ✓

24 a Holiday loading = 17.5% × 489 × 4
= \$342.30 ✓

b Total holiday pay = 4 weeks pay + Holiday loading
= 4 × 489 + 342.30
= \$2298.30 ✓

c Extra spending money = 2298.30 − 2000.00
= \$298.30 ✓

25 a Harry's annual Youth Allowance pension
= \$414.40 (from the table) × 26
= \$10 774.40 ✓

b Molly's weekly Youth Allowance pension
= \$226.80 (from the table) ÷ 2
= \$113.40 ✓