High School
Mathematics Test 2015

| Year 10 | **Financial Maths & Compound Interest** | Calculator Allowed |

Skills and Knowledge Assessed:
- Complete calculations related to making financial decisions.
- Solve problems involving simple interest (ACMNA211)
- Connect the compound interest formula to repeated applications of simple interest using appropriate digital technologies (ACMNA229)

Name_____

Section 1   Short Answer Section

Write all working and answers in the spaces provided on this test paper.
Calculators are allowed.

Simple Interest	Compound Interest
$I = PRN$	$A = P(1 + R)^N$
I is the interest earned P is the principal R is the interest rate per period as a decimal N is the number of periods	A is the total amount of the investment P is the principal R is the interest rate per period as a decimal N is the number of compounding periods

1. Wendy invests $6500 for 3 years at 6% p.a. simple interest. How much interest will she earn?

……………………………………………………………………………………....

……………………………………………………………………………………….

2. Peta invests $15 400 for 5 years and earns $5775 in simple interest. What annual rate was paid on her investment?

……………………………………………………………………………………....

……………………………………………………………………………………….

3. Chad bought a TV which had a cash price of $3500, by paying monthly instalments of $120 for 3 years. How much did he pay in interest?

……………………………………………………………………………………....

……………………………………………………………………………………….

Questions 4 and 5 refer to the table below which gives the value of $1.00 after being invested at different rates of compound interest for varying terms.

Years	Compound interest rate p.a.				
	2%	3%	4%	5%	6%
1	$1.0200	$1.0300	$1.0400	$1.0500	$1.0600
2	$1.0404	$1.0609	$1.0816	$1.1025	$1.1236
3	$1.0612	$1.0927	$1.1249	$1.1576	$1.1910
4	$1.0824	$1.1255	$1.1699	$1.2155	$1.2625

4. A principal of $8 000 is invested at 3% pa interest compounded annually. Find the value of the investment after 4 years.

…………………………………………………………………………………………………….

…………………………………………………………………………………………………….

5. An amount of money which is invested at 6% pa interest compounded annually is worth $4108.95 after 3 years. Find the amount that was invested (to the nearest ten dollars)?

…………………………………………………………………………………………………….

…………………………………………………………………………………………………….

Questions 6 and 7 refer to an investment of $8 000 with interest at 3% p.a. compounded annually.

6. What is the principal at the start of the second year?

……………………………………………………………………………………………….....

……………………………………………………………………………………………………

7. How much *more* interest is earned in the second year compared to the first year?

……………………………………………………………………………………………….....

……………………………………………………………………………………………………

8. Use the compound interest formula to find the value of $8000 invested at 9% p.a., compounding annually for 6 years.

……………………………………………………………………………………………….....

……………………………………………………………………………………………………

9.	Holly invests $2500 at 6% p.a. compounding quarterly. What is the value of the investment after 1½ years?
	………………………………………………………………………………………….... …………………………………………………………………………………………
10.	Four years ago, Amanda bought a photocopier for her business for $12 500 and it has depreciated at 12% p.a. over that time. What is its current value (to the nearest dollar)?
	………………………………………………………………………………………….... …………………………………………………………………………………………
11.	Two and a half years ago, Julian invested $32 000 in a term deposit paying interest at 9% p.a. compounded monthly. What is the current value of the investment?
	………………………………………………………………………………………….... …………………………………………………………………………………………
12.	Three and a half years ago, Toby invested $16 500 in an account that paid 7.2% p.a. compounding half-yearly. How much interest did he earn?
	………………………………………………………………………………………….... …………………………………………………………………………………………
13.	Five years ago, Charli invested an amount of money in an account that paid 4.8% p.a. compounding quarterly. The account is now worth $20 310.95. How much was in the account initially?
	………………………………………………………………………………………….... …………………………………………………………………………………………
14.	Noah invested $45 000 and after 3 years its value had grown to $54 204.75. If the interest was compounded annually, determine the interest rate, to the nearest percent.
	………………………………………………………………………………………….... …………………………………………………………………………………………
15.	The Flower Pot florist bought a new delivery van 3 years ago. It has depreciated at 15% p.a. since then. Its current value is $29 800. What was its value when new (to the nearest $100)?
	………………………………………………………………………………………….... …………………………………………………………………………………………

Year 10	*Financial Maths & Compound Interest*	Calculator Allowed
		Name_____

Section 2   Multiple Choice Section

Mark all your answers on the accompanying multiple choice answer sheet, not on this test paper. You may do any working out on this test paper. Calculators are allowed for this section.

1. Callum pays to carpet his unit by paying 26 fortnightly payments of $295. The cash price for the job was $6500. How much extra did he pay by choosing the fortnightly repayments?

    A. $45   B. $767   C. $1170   D. $7670

2. Annika buys a laptop which was originally priced at $1250 at a sale which offers 20% off all computers. She also gets an additional 6% discount off the sale price because she is a frequent customer. What did she pay for the laptop?

    A. $925   B. $940   C. $1000   D. $1224

Questions 3 and 4 refer to the following:
Blake invests $6500 in an account which pays 8% p.a. interest, compounded annually for 4 years. The partially complete table below shows the progress of the investment over the 4 years.

Year	Principal at the Start of the Year	Interest Earned During the Year	Principal at the End of the Year
1	$6500.00	$ 520.00	$7020.00
2	$7020.00	$561.60	$7581.60
3	$7581.60	$606.53	
4	P		Q

3. What number should appear at position P?

    A. $606.53   B. $6975.07   C. $7581.60   D. $8188.13

4. What number should appear at position Q?

    A. $655.05   B. $7533.08   C. $8843.18   D. $8925.06

5.	Use the compound interest formula to calculate the value of an investment of $18 000, at 6% p.a. compounding annually for 5 years.
	A. $24 088.06 B. $54 000.00 C. $188 743.68 D. $302 526.00

6.	Levi borrows $26 000 from the government to get him started in business and repays the full amount plus interest after 3 years. The government charges interest at 5% p.a. compounded annually. How much does he need to repay?
	A. $3900.00 B. $4098.25 C. $29 900.00 D. $30 098.25

7.	Summer has $12 000 invested in a term deposit for 3 years. The interest rate is 6.4% p.a. compounded annually. How much interest will Summer have earned at the end of the 3 years?
	A. $2304.00 B. $2454.60 C. $14 304.00 D. $14 454.60

8.	Bryce deposits $16 000 into a savings account and makes no deposits or withdrawals for 2½ years. The account pays 7.2% p.a. interest compounded monthly. How much will be in his account at the end of the time?
	A. $18 880.00 B. $19 037.37 C. $19 124.84 D. $19 145.18

9.	Danny bought a drum kit for $2800, three years ago. Over that time the kit depreciated at 15% p.a. What is it worth now?
	A. $1458.45 B. $1540.00 C. $1719.55 D. $4258.45

10.	Adele buys a motor scooter on terms over 3 years and pays $760 per month. If the cash price of the scooter was $18 500, what rate of **simple** interest did she pay, per annum?
	A. 16% B. 17%
	C. 18% D. 19%

11.	James sees a set of exercise equipment advertised for $2450.00. It can also be bought on a 3 year monthly payment plan. If they charge 17% p.a. **simple** interest for those buying on the plan, how much is each monthly payment?
	A. $102.76 B. $136.11 C. $1249.50 D. $1453.67

| 12. | Peter deposits $24 000 into an account that earns interest at the rate of 5.4% p.a. compounding monthly. How much will be in the account after 1½ years if he makes no deposits or withdrawals in that time? |

    A. $25 970.01   B. $26 020.17   C. $26 192.08   D. $61 850.36

| 13. | Which calculation would you use to find the amount that $16 000 grows to when invested at 6.8% p.a. interest compounding quarterly for three years. |

    A. $16\,000 \times 1.017^{3}$ B. $16\,000 \times 1.017^{12}$

    C. $16\,000 \times 1.068^{3}$ D. $16\,000 \times 1.068^{12}$

| 14. | Emily bought a 4WD truck five years ago. What was its original value (to the nearest $10) if it depreciated at   12% p.a. and is now worth $30 000? |

    A. $36 450

    B. $48 000

    C. $54 650

    D. $56 850

| 15. | Lindy invested $48 000 an account that paid 12% p.a. compounding quarterly. The account is now worth $ 86 693. How long was the money invested for? |

    A.   5 years   B.   8 years   C.   10 years   D. 20 years

High School
Mathematics Test 2015

Multiple Choice Answer Sheet

Financial Maths & Compound Interest

Name _____

Completely fill the response oval representing the most correct answer.

1.   A ◯   B ◯   C ◯   D ◯
2.   A ◯   B ◯   C ◯   D ◯
3.   A ◯   B ◯   C ◯   D ◯
4.   A ◯   B ◯   C ◯   D ◯
5.   A ◯   B ◯   C ◯   D ◯
6.   A ◯   B ◯   C ◯   D ◯
7.   A ◯   B ◯   C ◯   D ◯
8.   A ◯   B ◯   C ◯   D ◯
9.   A ◯   B ◯   C ◯   D ◯
10. A ◯   B ◯   C ◯   D ◯
11. A ◯   B ◯   C ◯   D ◯
12. A ◯   B ◯   C ◯   D ◯
13. A ◯   B ◯   C ◯   D ◯
14. A ◯   B ◯   C ◯   D ◯
15. A ◯   B ◯   C ◯   D ◯

High School
Mathematics Test 2015

Year 10	**Financial Maths & Compound Interest**	Non Calculator

Section 1 Short Answer Section

ANSWERS

No.	WORKING	ANSWER
1.	$I = PRN$ $= 6500 \times 0.06 \times 3$ $= \$1170$	$1170
2.	$I = PRN$ $5775 = 15400 \times R \times 5$ $5775 = 77000 \times R$ $R = \dfrac{5775}{77000}$ $R = 0.075$ Rate is 7.5 % p.a.	7.5% p.a.
3.	Amount paid $= 120 \times 3 \times 12$ $= \$4320$ Interest paid $= 4320 - 3500$ $= \$820$	$820
4.	3% for 4 years gives a factor of $1.1255 Amount $8000 grows to $= 1.1255 \times 8000$ $= \$9004$	$9004
5.	6% for 3 years gives 1.1910 $1.1910 \times P = 4108$ $P = \dfrac{4108}{1.1910}$ $= 3449.2023509655751469353484466835$ $= 3450$ (nearest $10)	$3450
6.	Interest for year 1 $= 0.03 \times 8000$ $= \$240$ Principal at start of 2*nd* year $= 8000 + 240 = \$8240$	$8240
7.	Interest for 2*nd* year $= 8240 \times 0.03$ $= \$247.2$ Difference $= 247.2 - 240 = \$7.20$ more	$7.20 more

8.	$P = 8000$ $R = 0.09$ $N = 6$ $A = P(1 + R)^N$ $\quad = 8000(1.09)^6$ $\quad = \$13\,416.80$	\$13 416.80
9.	$P = 2500$ $R = \dfrac{0.06}{4} = 0.015$ $N = 1.5 \times 4 = 6$ $A = P(1 + R)^N$ $\quad = 2500(1.015)^6$ $\quad = \$2733.61$	\$2733.61
10.	$P = 12500$ $R = 0.12$ $N = 4$ $A = P(1 - R)^N$ $\quad = 12500(0.88)^4$ $\quad = \$7496$ (nearest dollar)	\$7496 (nearest dollar)
11.	$P = 32000$ $R = \dfrac{0.09}{12} = 0.0075$ $N = 2.5 \times 12 = 30$ $A = P(1 + R)^N$ $\quad = 32000(1.0075)^{30}$ $\quad = \$40\,040.70$	\$40 040 .70
12.	$P = 16500$ $R = \dfrac{0.072}{2} = 0.036$ $N = 3.5 \times 2 = 7$ $A = P(1 + R)^N$ $\quad = 16500(1.036)^7$ $\quad = \$21\,135.00$ Interest earned $= 21135 - 16500$ $\quad = \$4635$	\$4635

13.	$P = \ ?$ $A = \ 20310.95$ $R = \dfrac{0.048}{4} = \ 0.012$ $N = \ 5 \times 4 \ = \ 20$ $A = \ P(1 + R)^{N}$ $20310.95 = \ P(1.012)^{20}$ $20310.95 = \ 1.26943 \times P$ $P = \dfrac{20310.95}{1.26943}$ $= \$16\ 000$	$16\ 000
14.	$P = \ 45000$ $A = \ 54204.75$ $R = \ ?$ $N = \ 3$ $A = \ P(1 + R)^{N}$ $54204.75 = \ 45000(1 + R)^{3}$ $(1 + R)^{3} = \dfrac{54204.75}{45000}$ $(1 + R)^{3} = \ 1.20455$ $1 + R = \ \sqrt[3]{1.20455}$ $= \ 1.06399995760076714982$ $1 + R = \ 1.064$ $R = \ 0.064$ Rate is 6 % p.a. (nearest %)	6% p.a. (nearest %)
15.	$P = \ ?$ $A = \ 29800$ $R = \ 0.15$ $N = \ 3$ $A = \ P(1 - R)^{N}$ $29800 = \ P(0.85)^{3}$ $29800 = \ 0.614125 \times P$ $P = \dfrac{29800}{0.614125}$ $= \$48524.32$ $= \$48\ 500$ (nearest 100 dollars)	$48\ 500

High School
Mathematics Test 2015

Year 10	**Financial Maths & Compound Interest**	Calculator Allowed

Section 2   Multiple Choice Section

ANSWERS

No.	WORKING	ANSWER
1.	Cost to pay it off $=$ $26 \times 295 = \$7670$ Extra paid $= 7670 - 6500 = \$1170$	C

2.	Price after first discount $= 1250 \times 0.8$
	    $= \$1000$
	Price after second discount $= 1000 \times 0.94$
	    $= \$940$
		B

3.	<table><tr><td>3</td><td>$7581.60</td><td>$606.53</td><td>P</td></tr><tr><td>4</td><td></td><td></td><td>Q</td></tr></table> $P = 7581.60 + 606.53 = \$8188.13$	D

4.	Interest $= 8188.13 \times 0.08$
	    $= 655.0504 = 655.05$
	$Q = 8188.13 + 655.05$
	    $= \$8843.18$
		C

5.	$A = P(1 + R)^N$
	    $= 18000(1.06)^5$
	    $= \$24\,088.06$
		A

6.	$A = P(1 + R)^N$
	    $= 26000(1.05)^3$
	    $= \$30\,098.25$
		D

7.	$A = P(1 + R)^N$
	    $= 12000(1.064)^3$
	    $= \$14\,454.60$
	Interest $= 14454.60 - 12000$
	    $= \$2454.60$
		B

8.	$R = \dfrac{0.072}{12} = 0.006$ $N = 2.5 \times 12 = 30$ $A = P(1 + R)^N$ $\quad = 16000(1.006)^{30}$ $\quad = \$19\ 145.18$	D
9.	$A = P(1 - R)^N$ $\quad = 2800(1 - 0.15)^3$ $\quad = 2800(0.85)^3$ $\quad = \$1719.55$	C
10.	Amount paid $= \quad 3 \times 760 \times 12 = \$27360$ Interest $= 27360 - 18500 = \$8860$ $\qquad\qquad I = PRN$ $\qquad 8860 = 18500 \times R \times 3$ $\qquad 8860 = 55500 \times R$ $\qquad\quad R = 0.1596$ $\quad$ Rate $= 16\%$ (nearest percent)	A
11.	$\quad I = PRN$ $\quad\ = 2450 \times 0.17 \times 3$ $\quad\ = \$1249.5$ Amount to repay $= 1249.5 + 2450$ $\quad\ = \$3699.50$ Repayment $= 3699.5 \div 36$ $\quad\ = \$102.76$	A
12.	$R = \dfrac{0.054}{12} = 0.0045$ $N = 1.5 \times 12 = 18$ $A = P(1 + R)^N$ $\quad = 24000(1.0045)^{18}$ $\quad = \$26\ 020.17$	B
13.	$P = 16000$ $R = \dfrac{0.068}{4} = 0.017$ $N = 3 \times 4 = 12$ $A = P(1 + R)^N$ $\quad = 16000(1.017)^{12}$	B

14.	$A = P(1-R)^N$ $30000 = P(0.88)^5$ $30000 = 0.5277319168 \times P$ $P = \dfrac{30000}{0.5277319168}$ $\quad = 56847.0449$ $\quad = \$56\,850$	D
15.	$P = 48000$ $A = 86693$ $R = \dfrac{0.12}{4} = 0.03$ $N = 4 \times n$ $86693 = 48000(1.03)^N$ $(1.03)^{4n} = \dfrac{86693}{48000}$ $\quad = 1.806104166$ *By* trial and retrial $1.03^{20} = 1.806111234669413$ $4n = 20$ $n = 5$	A

High School
Mathematics Test 2015

Multiple Choice Answer Sheet

Financial Maths & Compound Interest

Name _____ANSWERS_____

Completely fill the response oval representing the most correct answer.

1. A ◯ B ◯ C ● D ◯
2. A ◯ B ● C ◯ D ◯
3. A ◯ B ◯ C ◯ D ●
4. A ◯ B ◯ C ● D ◯
5. A ● B ◯ C ◯ D ◯
6. A ◯ B ◯ C ◯ D ●
7. A ◯ B ● C ◯ D ◯
8. A ◯ B ◯ C ◯ D ●
9. A ◯ B ◯ C ● D ◯
10. A ● B ◯ C ◯ D ◯
11. A ● B ◯ C ◯ D ◯
12. A ◯ B ● C ◯ D ◯
13. A ◯ B ● C ◯ D ◯
14. A ◯ B ◯ C ◯ D ●
15. A ● B ◯ C ◯ D ◯