Name: _____ Date: _____

Baldivis Secondary College

Year 11 Applications

Test 1, 2016

Topics – Substitution & Formulas, Percentages & Rates and Simple & Compound Interest

	50
	=___ %

Total Time:	***60*** *minutes*
Total Reading:	*5 minutes*
Total Working:	*55 minutes*
Weighting:	*5% of the year, 10% of the semester.*
Equipment:	*SCSA Formula Sheet; 1 page notes (A4 one side, **Unfolded**), CASIO ClassPad; Scientific Calculator*

SECTION 1: CALCULATOR FREE

Time:	***20*** *minutes*	**Marks for Section 1:**	*17*
Reading:	*2 minutes*	**Equipment Allowed:**	*Nil*
Working:	*18 minutes*		

1. [4 marks: 1 mark each]
Find the value of each of the following expressions given that $x = 4$ and $y = 3$.

a) $2x^2$ 32

b) $(x-2)^3$ 8

c) $6x - 2y$ 18

d) $(x+y)^2$ 49.

2. [4 marks: ½ mark each]
Complete the following conversions, simplifying fractions when possible.

Fraction	Decimal	Percent
$\frac{1}{3}$	0·333	33·33%
$\frac{4}{5}$	0·8	80%
$\frac{19}{20}$	0.95	95%
$\frac{1}{8}$	0.125	12·5%

3. **[1 mark]**
If 2% of an amount is $18, how much is the original amount

2% = 18
100% = $900

4. **[2 marks]**
Penny, the plum seller, normally sells her plums for $16.00/box. Penny decided to discount them by 25%. Calculate the sale price.

16 x 0·75 or $12·00
16 x 0·25 then subtract from 16.

5. **[2 marks]**
Sally showed the following calculations for an $8000 investment earning simple interest @ 2.2 % p.a. for 4 years. Determine the error(s) in Sally's mathematics calculations, making necessary corrections.

Simple Interest = $ 6000 x 0.22 x 4
8000 0·022

6. **[2 marks]**
Using the formula v = u + at, calculate v given:
u = 16
a = 0.5
t = 15
V = 16 + (0·5 x 15) = 23·5

7. **[2 marks: 1 mark each]**
Give worded definitions for the following financial terms:

i) Per annum:
Per year

ii) Principal:
The amount borrowed.

~ END OF TEST SECTION 1 ~

Name: _____ Date: _____

SECTION 2: CALCULATOR ASSUMED

Time:	*40 minutes*	**Marks for Section 2:**	*33*
Reading:	*3 minutes*	**Equipment Allowed:**	*1 page notes (A4 one side, unfolded), CASIO ClassPad, scientific calculator*
Working:	*37 minutes*		

8. **[2 marks: 1, 1]**

Courtney invests $25 000 at 2.65% p.a simple interest. Calculate the following.

a) How much interest would she receive if she invested it for 12 months?

$25000 \times 0.0265 \times 1 = \$662.50$

b) What will be the final value of this investment after the 12 months?

$\$25662.50$

9. **[2 marks]**

How much interest will be earned if $42 300 is invested for 120 days in an account that pays 12.5% per annum simple interest?

$42300 \times \frac{0.125}{365} \times 120 = \$1738.36$

10. **[2 marks]**

Frank, Tom's brother, runs a hardware store. To sell a lawn mower that he has had in the store for 2 years he decides to sell it at a $12\frac{1}{2}$% loss. Thomas sells the lawn mower for $262.50. What was the original price for the mower?

$\frac{262.50}{0.875} = 300.$

11. [2 marks]

Dayna bought a house for $345 000 and sold it 5 years later for $450 000. What was her percentage profit?

$\frac{105000}{345000} \times 100 = 30.43\%$.

12. [3 marks: 1, 2]

Ohms Law relates the current in an electric circuit (*I amps)* to the voltage (V *volts*) and the circuit resistance (R *ohms*). Use the formula $I = \frac{V}{R}$ to determine:

a) The current, if the voltage is 15 volts and resistance is 24 ohms.

$I = \frac{15}{24}$

$I = 0.625$ amps.

b) Given that Ohms Law can also be written as $V = RI$, calculate the voltage given that the current is 4 amps and the resistance 8 ohms.

$V = 4 \times 8$

$V = 32$

32 volts.

13. [2 marks: 1, 1]

If Daniel borrows $5000 from a bank for 5 years with an interest rate of 5.75% p.a. compounded monthly, determine:

a) The compounded amount.

$T = P(1 + \frac{r}{n})^{nt}$

$= 5000(1 + \frac{5.75}{100 \times 12})^{12 \times 5}$.

$= \$6660.88$

b) How much interest will Daniel have to repay?

$1660.88

14. [2 marks]

Assuming that the annual rate of inflation remains steady at 2.9%, what would the value of an item be in three years' time if it costs $90.00 now?

$90 \times 1.029^3 = \$98.06.$

15. [6 marks: 1, 1, 2, 2]

If $m = 4$, $n = -3$ and $p = 2.95$, determine:

a) $2mn - p$

-26.95

b) $3m^2 + 2np$

$48 + (-17.7) = 30.3.$

c) $\frac{16m^2n}{12mn^2}$

$\frac{-768}{432} = -1.78$ 2dp.

d) $p^2 + 4n(m - p)$

$2.95^2 + 4(-3)(4 - 2.95)$

$8.7025 + -12(1.05)$

$8.7025 + -12.6$

-3.8975

16. [5 marks: 1, 1, 3]

An electronics store increased the prices of all laptops by 8%. A laptop originally cost $995.

a) What was the new price of the laptop after the price increase?

$\$995 \times 1.08 = \$1074.60.$

b) During the end of year sales, all stock was now discounted by 10%.

What is the price of the laptop during the end of year sales?

$\$1074.60 \times 0.9 = \$967.14$

c) Calculate the overall **percentage change** in price from the original price.

$\$995 - \$967.14 = \$27.86$

$\frac{27.86}{995} \times 100 = 2.8\%$ decrease.

17. [2 marks]

The details below show the transactions for an account that pays interest of 4.35% per annum calculated monthly and based on minimum monthly balance. Interest earned in January (31 days) and February (28 days) will be added to the account on the 1st of March.

Date	Credit	Debit	Balance
2nd January		$253	$1856.23
12th January	$452.35		$2308.58
27th January		$1500	$808.58
5th February	$2364.95		$3173.53
20th February		$1821.15	$1352.38

Calculate the interest for January and February, rounding to the nearest cent.

Jan $808.58 \times \frac{0.0435}{365} \times 31 = \$2.99$

Feb $808.58 \times \frac{0.0435}{365} \times 28 = \$2.70$

18. [2 marks]

Tom's annual salary is $82 000. What percentage increase in earnings is required to take his salary to at least $96 000? (Give your answer to 1 decimal place)

$96000 - 82000 = 14000$

$\frac{14000}{82000} \times 100 = 17.1$

17.1% increase is required.

19. **[3 marks]**

A real estate salesman is paid commission of 1.2% of the value of all properties sold. He sells two houses, one for $455 000 and another for $762 000. Calculate the total commission the agent will receive.

$455000 + 762000 = 1,217,000$

$1,217,000 \times 0.012 = 14604.$

$14,604 Commission

~ END OF TEST SECTION 2 ~