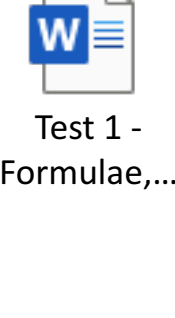


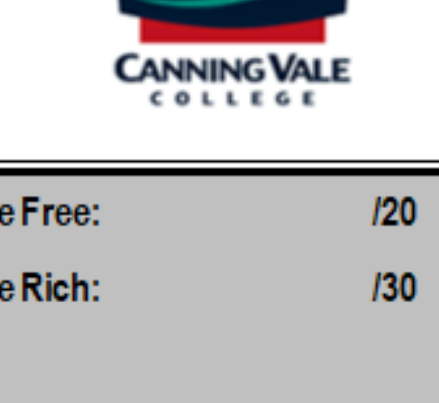
# Test 1 – Formula, Percentages and Interest Sol

Thursday, May 19, 2022

6:12 AM



NAME: \_\_\_\_\_



## Response Item: Test 1 – Formulae, Percentages, and Interest

### Year 11 Applications Mathematics

**Section 1: Resource Free**  
**Time: 25 minutes**

Resource Free:	/20
Resource Rich:	/30
<b>Total:</b>	<b>/50</b>
	<b>%</b>

#### TIME ALLOCATION FOR THIS TEST

**Section 1 – Resource Free**

**25 minutes working time**

**After exactly 25 minutes have elapsed Section 1 will be collected, and Section 2 will begin.**

**Section 2 – Resource Rich**

**30 minutes working time**

**Material required/recommended for this test**

**To be provided by the supervisor**

Question/answer booklet for Section One and Two, and formula sheet.

**To be provided by the candidate**

**Section One:**

Standard items: pens, pencils, pencil sharpener, highlighter, eraser, ruler

Special materials: drawing instruments, templates.

**Section Two:**

Standard items: pens, pencils, pencil sharpener, highlighter, eraser, ruler

Special materials: drawing instruments, templates, notes on a maximum of **one single sided** unfolded sheet of A4 paper, up to three calculators (CAS, graphics or scientific)

#### Important note to candidates

No other items may be taken into the test room. It is **your** responsibility to ensure that you do not have any unauthorised notes or other items of a non-personal nature in the test room. If you have any unauthorised material with you, hand it to the teacher **before** reading any further.

Although marks are not necessarily awarded for working, it is recommended that **enough working to justify** your responses is shown. Incorrect answers with no working will be awarded **zero** marks.

**[3 marks]**

1. Solve for  $A$  given  $P = 500$ ,  $r = 0.2$ , and  $t = 2$ :

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

**[2 marks]**

2. Evaluate the expression below using  $a = 5$ ,  $b = 0.5$ , and  $x = 1.5$ :

$$\frac{3ab}{x}$$

**[5 marks – 2, 3]**

3. The formula below calculates distance travelled in meters ( $s$ ), over a given time in seconds ( $t$ ), with an initial velocity in meters per second ( $u$ ), and an acceleration in meters per second per second ( $a$ ):

$$s = ut + \frac{1}{2}at^2$$

- a) How far would an object travel over 12 seconds if it had an initial velocity of 2.5 meters per second and an acceleration of 4 meters per second per second?

- b) By how much does the distance travelled in a) increase if the time is doubled and all other values remain the same?

**[5 marks – 2, 3]**

4. Evaluate:

- a) 18% of 68 kg

- b)  $\frac{3\sqrt{9x-18}}{(12-x)^2}$  when  $x = 6$

**[5 marks – 2, 3]**

5. A company buys graphics cards for \$320 per unit and sells them for \$800

- a) Represent this mark up as a percentage:

- b) What percentage of the sale price is profit?

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**Section 2: Resource Rich**

**End of Section 1**

**Time: 30 minutes**

**[7 marks – 3, 2, 2]**

6. The Body Adiposity Index ( $BAI$ ) is used in health fitness applications to give a rough calculation of body fat. The spreadsheet below has been filled out using this formula where  $c$  represents hip circumference in centimetres, and  $h$  represents height in meters:

$$BAI = \frac{c}{h^{1.5}} - 18$$

	A	B	C	D	E	F	G
1							
2							
3			1.5	1.6	1.7	1.8	1.9
4		50	9.2	6.7	4.6	4.5	1.1
5		60	14.7	11.6	9.1	6.8	4.9
6		70	20.1	16.6	13.6		8.7
7		80	25.5	21.5	18.1	15.1	12.5
8		90	31.0	26.5	22.6	19.3	16.4

- a) Calculate the value of the empty cell with appropriate rounding:

- b) One of the precalculated cells is incorrect, identify this cell by its cell reference (e.g. B2) and calculate the correct value for the cell

- c) Cell D6 is calculated correctly using a spreadsheet formula, write the formula for this cell below:

=

**[8 marks – 2, 3, 3]**

7. The Uncommonwealth Bank offers a term deposit (investment account). This account pays interest at 5.25% p.a., compounding monthly, but requires a deposit of \$10 000 and the initial deposit and interest accrued will only be released after three years:

- a) Yash wishes to invest in this term deposit but only has \$9200 saved and has decided to take out a simple interest loan at a daily interest rate of 0.0475% for the remainder.

Calculate the amount of interest this loan will accrue over the three years:

- b) With the money from the loan, Yash invests \$10 000 in the term deposit, calculate the amount of interest this investment will accrue over the three years:

- c) Over the three years of the loan inflation stayed steady at 3.5% p.a. Show that by Yash investing his money he was able to outpace inflation hence increasing the buying power of his money

8. Below is an account statement including all transactions in the account for the month of September (30 days).

Date	Transaction	Debit	Credit	Balance
01/09/2021	Initial Balance			\$320
07/09/2021	Nando's inc.	\$19.80		\$300.20
19/09/2021	HJ's HO		\$290.45	\$590.65
25/09/2021	Coles	\$52.10		\$538.55

- a) Calculate the interest this account accrued using the Minimum Monthly Balance method given that the interest rate was 5.4% p.a. for the entire month:

- b) Recalculate the interest for this account using the Daily Balance method and state the increase in interest this method gives as a percentage:

**[8 marks – 2, 3, 3]**

9. A business buys products at **cost price**, increases this price by a fixed percentage to the **pre-GST price**, then increases this amount by 10% to get the **GST included price** (i.e. sale price). Sometimes items are then discounted or marked up due to sales or shortages etc.

Item ID	Item Description	Cost Price	Pre-GST	GST Included (Sale Price)
111093	Deck Chair	\$58		\$140.36
121004	4-Burner BBQ	\$280	\$616	\$677.60
118501	Outdoor Umbrella	\$40	\$88	
113387	Insect Zapper	\$78	\$171.60	\$188.76
000203	Wheelbarrow		\$264	\$290.40

- a) By what fixed percentage is the cost price increased to get the pre-GST price?

- b) Add the missing values to the table above

*(1 mark each)*

- c) This company has decided to sell a specific item with a cost price of \$190 to their customers however, to be competitive they have decided to sell it for \$400 (inc. GST).

By how much has this decision reduced their pre-GST profit compared to their normal pricing scheme?

**End of Test**