



Student Name:

*Solutions*

Mathematics Teacher:

## ***St Mary's Cathedral College 2023***

### **Assessment Task 1**

# **Year 9 Mathematics 5.3**

#### **Content:**

Number Computations

Financial Mathematics

**Date:** Tuesday 28th March 2023

**Time allowed:** 50 minutes

**Weighting:** 25%

**Total Mark:** 54 marks

#### **General Instructions:**

- Write using blue or black pen
- Use pencil for diagrams and graphs
- All necessary working should be shown for every question
- Calculators are able to be used in this test.
- Attempt all questions
- Mark value of questions is as shown
- Answer each question in the space provided.

<b>Outcomes:</b>	<b>Total</b>
MA4-4NA Compares, orders and calculates with integers, applying a range of strategies to aid computation	
MA4-5NA Operates with fractions, decimals and percentages	
MA5.1-4NA Solves financial problems involving earning, spending and investing money	
<b>Working Mathematically</b> MA5.1-1WM, MA5.1-2WM, MA5.1-3WM, MA5.2-1WM, MA5.2-2WM	
<b>TOTAL</b>	/54

## NUMBER COMPUTATION AND FINANCIAL MATHEMATICS

Marks

1. Evaluate the following:

(a)  $3 \times (7 - 5) \div 2$

1

$$\frac{3 \times 2}{2} = 3$$

(b)  $\frac{-(7)^2}{12 + (-5)}$

1

$$= \frac{-49}{12 - 5} = \frac{-49}{7} \\ = -7$$

2. The distances between Melbourne to Sydney and Sydney to Brisbane are 878.674 km and 917.398 km respectively. Calculate the total distance, Melbourne to Brisbane to Sydney, rounded to 1 decimal place.

\* Must be correct  
to 1 dp. to receive mark!

$$878.674 \\ + 917.398 = 2713.47 \\ + 917.398$$

3.

- Evaluate  $\frac{\sqrt{144}}{17}$  rounding your answer to three significant figures.

2

$$\frac{12}{17} = 0.705882\ldots \quad (1 \text{ mark}) \\ \therefore = 0.706 \quad (1 \text{ mark})$$

4. Express 18.75% as a fraction in its simplest form.

1

(can use calculator)  $\frac{18.75}{100} = \frac{3}{16}$

5. Increase \$280 by 35% .

2

$$100\% + 35\% = 135\%$$

$$\therefore 280 \times 135\% \quad (1 \text{ mark})$$

$$= \$378 \quad (1 \text{ mark})$$

can do

$$280 \times 35\%$$

$$= \$98 \quad \therefore 280 + 98 = \$378$$

6. Tickets were going on sale for the Royal Easter Show and James noted that the price had increased from \$36 to \$46 per person since last year. Find the percentage increase to the nearest whole percentage.

2

$$\$46 - \$36 = \$10$$

$$\therefore \frac{10}{36} \times 100 \quad (1 \text{ mark})$$

$$= 27.777$$

$$= 28\% \text{ increase} \quad (1 \text{ mark})$$

7. George works as a plumber in a building firm. If his annual salary is \$98 975, how much would he earn per week? Give your answer correct to the nearest cent. 1

$$\text{Annual Salary} = \frac{\$98975}{52} \therefore \text{divide by 52}$$
$$= \$1903.365385$$

$$\text{George would earn to nearest cent} = \$1903.37\text{¢}$$

8. Michael needs a new computer for his business, and decides to take out a loan of \$4750. The simple interest charged by the bank is 5.8% p.a. for 3 years.

- (a) Calculate the amount of interest the bank will charge. 2

$$SI = PRN$$

$$\therefore SI = 4750 \times 5.8\% \times 3$$

Interest charged will be \$826.50<sup>9</sup>

- (b) Michael has decided to pay the loan over 3 years in monthly installments. 2

Calculate the value of Michael's monthly installment.

$$3 \text{ years} \times 12 = 36 \text{ monthly installments}$$

$$\# (\text{mark}) \therefore 4750 + 826.50 = \$5576.50$$

$$\therefore \frac{5576.50}{36} = \$154.90\text{¢} \text{ to pay each month.}$$

(1 mark)

9. Genesis is a new car dealership in Sydney. Raphael is offered a job where he earns a retainer of \$350 per week plus a 2% commission on the value of his sales in excess of \$125 000. 2  
 Find his total pay for the week when his sales total \$251 000.

$$350 + 2\% (251000 - 125000) \quad (1 \text{ mark})$$

$$= \$2870 \text{ for 1 week's work.} \quad (1 \text{ mark})$$

10. Andersen receives a sum of money as a birthday gift. He decides to invest it over 10 years using simple interest at 6.1% p.a. If he earns \$3050 interest, how much did he invest? 2

$$SI = PRN$$

$$3050 = P \times 6.1\% \times 10$$

$$R = 0.061$$

$$N = 10$$

$$\therefore \frac{3050}{0.061 \times 10} = \frac{P \times 0.061 \times 10}{0.061 \times 10} \quad (1 \text{ mark})$$

*(correct substitution)*

$$P = \$5000$$

Andersen invested \$5000. (1 mark)

11. Lisa's car has been depreciating at 33.5 % each year. She purchased it 5 years ago for \$27 500. 2  
 Find the value of her car after these 5 years.

$$\text{Dep. Value} = 27500 (1 - 33.5\%)^5$$

*correct substitution  
(1 mark)*

$$\therefore V = 27500 (1 - 0.335)^5$$

$$\text{Salvage Value} = \$3576.36 \quad (\text{1 mark})$$

12. Show what number *could* be placed in the box,  $\frac{\square}{11}$ , for this fraction to have a value between 6 and 7. 2

$$\frac{x}{11} = 6$$

$$\therefore x = 66$$

*a number must lie  
between 66 and 77*

$$\text{and } \frac{x}{11} = 7$$

*but not including 66 or 67  
(1 mark)*

$$\therefore x = 77$$

*number must be  
 $66 < x < 77$*

*greater than 66 but less than 77  
(1 mark)*

13. A shop sells three different sized containers of soft drink shown here.

3



375mL

500ml

450mL

\$1.33

\$1.50

\$1.12

Provide calculations to show which of the soft drink containers is the best buy.

$$1.33 : 375 \text{ mL}$$

$$x : 100$$

$$1.50 : 500 \text{ mL}$$

$$x : 100 \text{ mL}$$

$$1.12 : 450 \text{ mL}$$

$$x : 100 \text{ mL}$$

$$x = \frac{1.33 \times 100}{375}$$

$$x = \frac{1.50 \times 100}{500}$$

$$x = \frac{1.12 \times 100}{450}$$

$$= \$0.35/\text{100mL} \quad x = \$0.30/\text{100mL} \quad x = \$0.25/\text{100mL}$$

$\therefore$  The 450 mL drink is best buy.

(2 marks) 3 correct values (1 mark) showing correct answer

14. Ethan decides to borrow \$200 000 from the bank to buy a holiday home. He intends to repay the loan over 20 years. The interest charged was 3.8% p.a. compounded annually.

- (a) Find the total amount Ethan will need to repay to the nearest dollar.

2

$$\text{Total Cost} = C_1 = P(1+r)^n$$

$$C_1 = 200000(1+3.8\%)^{20}$$

$$= 421674.2352$$

correct substitution  $\therefore$  Ethan will need to pay

$$\$421674.24 \quad (1 \text{ mark})$$

(b) How much interest will he pay?

1

$$\begin{array}{r} \$421674.24 \\ - 200000.00 \\ \hline \end{array}$$

$$\text{Interest paid} = \$221674.24 \quad (\text{1 mark})$$

15. Georgie and Peter and Monica purchased a lottery ticket in the ratio of 7 : 5 : 4.

3

They hit the Jackpot and won \$1 000 000. What amount did Georgie and Monica each win?

$$\text{Ratio Total} = 7+5+4 = 16 \quad (\text{1 mark})$$

$$\begin{array}{r} 1000000 \\ \hline 16 \\ \hline = \$62500 \end{array}$$

$$\therefore \text{Georgie won } \$62500 \times 7 \quad (\text{1 mark})$$
$$= \$437500$$

$$\text{and Monica won } \$62500 \times 4 \quad (\text{1 mark})$$

$$= \$250000$$

16. Tracey's car has a fuel consumption of 100km/L while Clare's car has a fuel economy of 112km/L.

- (a) Which car is more economical? Explain.

1

..... Tracey travels for 100km for every litre of petrol.  
..... whereas Clare can travel 112km for every litre  
..... Clare's car is more economical as she  
..... can travel 12 km more per litre

- (b) How far can Tracey travel on 45L of fuel?

1

..... Tracey 100/k : 1 litre  
..... Distance : 45L (1 mark)

$$\therefore D = 100 \times 45$$
$$D = 4500 \text{ km or } 45 \text{ L of fuel}$$

- (c) How much fuel does Clare's car use in travelling the same distance?

1

..... 112 k : 1 litre  
..... 4500 k : xL (1 mark)

$$\therefore 112x = 4500$$

$$x = \frac{4500}{112} = 40.18 \text{ L}$$

..... Clare's car uses just  
..... 40.18 litres.

17. Anna is a physiotherapist and works at the RNS Hospital. This table shows the income tax rates for the last financial year when she calculated her tax.

<i>Taxable income</i>	<i>Tax payable on this income</i>
0 – \$18 200	Nil
\$18 201 – \$45 000	19 cents for each \$1 over \$18 200
\$45 001 – \$120 000	\$5092 plus <u>32.5</u> cents for each \$1 over <u>\$45 000</u>
\$120 001 – \$180 000	\$29 467 plus 37 cents for each \$1 over \$120 000
\$180 001 and over	\$51 667 plus 45 cents for each \$1 over \$180 000

- (a) Anna has a gross annual salary of \$88 000. She has allowable tax deductions of \$350 for Uniform and shoes and \$475 for travel expenses. Show that her taxable income is \$87 175.

$$88000 - 350 - 475 = \$87175$$

as required.

(1 mark)

- (b) Calculate her tax payable.

use Row 3.

correct substitution  
(1 mark)

$$\therefore \text{Tax Payable} = \$5092 + 0.325(87175 - 45000)$$

$$= \$18798.88$$

(1 mark)

- (c) Anna must also pay a Medicare Levy of 2% of her taxable income.

1

Calculate the Medicare Levy she will need to pay.

$$\$87175 \times 2\%$$

$$= \$1743.50 \quad (1 \text{ mark})$$

18. A new T.V. was on sale with a 25% discount. If Madeleine paid cash, she would receive a further 12% on the already discounted price.

2

What was the overall percentage discount Madeleine received if she paid cash?

$$\text{First price} = 75\% \text{ of } x$$

$$\therefore \text{Price} = 0.75x$$

$$\text{Then cash discount} = 12\% = 0.88 \text{ of original price}$$

$$\therefore 0.88 \times 0.75x \quad (1 \text{ mark})$$

for boths

$$= 0.66\% = \text{new price}$$

$$\therefore \text{Total Discount} = 100 - 66$$

$$= 34\% \quad 1 \text{ mark}$$

(for subtraction)

19. Adrian earns \$22.50 an hour for a normal 38 hour week. For any overtime, he receives time and a half.

- (a) How much does he earn in a week in which he works 44 hours?

3

$$38 \times \text{normal hours} + \\ (44 - 38) \text{ time and a half} \quad (1 \text{ mark})$$

$$\therefore 38 + (6 \times 1.5)$$

$$= 38 + 9 = 47 \text{ hours}$$

$$\therefore 47 \times 22.50 \quad (1 \text{ mark})$$

$$= \$1057.50 \text{ earned that week.} \quad (1 \text{ mark})$$

- (b) How much extra overtime would he need to work, in this week, to earn \$1260?

2

OR

$$\begin{array}{r} 1260 \\ - 1057.50 \\ \hline 202.50 \\ - 33.75 \\ \hline 68.75 \end{array}$$

$$38 \text{ hours} \times 22.50 = \$855$$

$$1260 - 855 = \$405$$

{ (mark)}

$$\begin{array}{r} \$22.50 \times 1.5 \text{ hrs.} \\ = \$33.75 \end{array}$$

$$\begin{array}{r} 68.75 \\ + 6 \\ \hline 74.75 \\ - 33.75 \\ \hline 41.00 \end{array}$$

$$\therefore \frac{\$405}{\$33.75} = 12 \text{ hours. He would need to work an extra 12 hours.}$$

{ (mark)}

20. As part of his terms of employment, Chris receives  $17\frac{1}{2}\%$  holiday loading for his annual four week holiday. If Chris receives a total of \$6200 for his holiday pay, find his normal weekly pay.

3

$$4 \times 117\frac{1}{2} = 6200 \quad \therefore \text{rearrange equation}$$

$$6200 = 117\frac{1}{2}\% \times 4 \quad (\text{1 mark})$$

$$\begin{aligned} (\text{1 mark}) & \therefore \frac{6200}{4 \times 117.5\%} \\ & \therefore \text{divide by 4 for one week and remove loading} \end{aligned}$$

$$(\text{1 mark}) = \$1319.15 \quad \text{per week}$$

$$\underline{\text{OR}} \quad 117\frac{1}{2}\% = 6200$$

$$1\% = \$52.765 \quad \text{per week}$$

$$\text{and } 100\% = \$5276.60 = 4 \text{ weeks}$$

$$\therefore \frac{5276.60}{4}$$

$$= \$1319.15 \text{ per week}$$

21. St George Building Society advertises investment accounts at the following rates:

**Option A:** 3.875% p.a. compounding daily.

**Option B:** 3.895% p.a. compounding monthly.

**Option C:** 3.9% compounding half yearly.

- (a) Julie wants to invest \$20 000 for 4 years using Option A. She thinks this is the best one because the interest is calculated more frequently.

3

Eliza also wants to invest \$20 000 for 4 years, using Option C. She thinks this is the best one because it has the highest interest rate.

Determine who will get the better deal, using appropriate calculations and clear setting out to justify your answer

Julie Option A

$$P = 20000$$

$$N = 4 \times 365$$

$$r = \frac{3.875\%}{365 \times 100}$$

$$\therefore C_1 = 20000 \left(1 + \frac{0.03875}{365}\right)^{4 \times 365}$$

$$= \$23352.97$$

(1 mark)

Eliza Option C

$$P = 20000$$

$$N = 4 \times 2 = 8$$

$$C_1 = 20000 \left(1 + \frac{0.039}{2}\right)^{4 \times 2}$$

$$r = \frac{3.9\%}{2 \times 100}$$

$$C_1 = 23341.45$$

(1 mark)

$\therefore$  Julie will receive \$11.52 more

using Option A

(1 mark)

- (b) Calculate if either Julie or Eliza would have achieved a better rate had either of them chosen Option B

2

Option B

$$P = 20000$$

$$N = 4 \times 12 = 48$$

$$C_1 =$$

$$r = \frac{3.895\%}{12 \times 100}$$

$$t = 0.00324583$$

$$\therefore C_1 = 20000 (1 + 0.00324583)^{48}$$

(1 mark)

$$C_1 = \$23365.95$$

(1 mark)

Yes both of them would have received approximately \$20 more.

**End of Assessment task**