Name	Index Number	Class

WOODGROVE SECONDARY SCHOOL

A COMMUNITY OF FUTURE-READY LEARNERS AND THOUGHTFUL LEADERS

END-OF-YEAR EXAMINATIONS 2023

LEVEL & STREAM : SECONDARY 1 NORMAL ACADEMIC

SUBJECT (CODE) : MATHEMATICS SYLLABUS A (4045)

DATE (DAY) : 11 OCTOBER 2023 (WEDNESDAY)

DURATION : 2 HOURS
(FOR SECTION A AND B)

Section A

READ THESE INSTRUCTIONS FIRST

Write your name, index number and class on all the work you hand in.
Write in dark blue or black pen.
You may use a soft pencil for any diagrams, graphs, tables or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **ALL** questions.

If working is needed for any question it must be shown with the answer.
Omission of essential working will result in loss of marks.
The use of an approved scientific calculator is expected, where appropriate.
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.
For π, use either your calculator value or 3.142, unless the question requires the answer in terms of π.

The number of marks is given in brackets [ ] at the end of each question or part question.
There are 2 sections in this paper and the total number of marks is **70**.

SECTION A (35 MARKS)

DO NOT TURN OVER THE QUESTION PAPER UNTIL YOU ARE TOLD TO DO SO.

Student's Signature		Parent's Signature	
Date		Date	

35

Answer **all** the questions.

1 Arrange the given numbers in descending order.

$$0.101 \qquad \frac{1}{11} \qquad -0.1 \qquad 0.\dot{1}$$

Answer ....., ..., ..., ... [2]

2 Express 18 km/h in m/s.

Answer ..... m/s [2]

3 **(a)** Express 150 as the product of its prime numbers, giving your answer in index notation.

Answer ..... [1]

(b) Hence find the smallest value of n if $150n$ is a perfect square.

Answer ..... [1]

4 Given that $a = 2$ and $b = -1$, find the value of $3a + b^2$.

Answer ..... [2]

5 Simplify the following algebraic expressions.

(a) $3c + 2d - 2c + 4d$,

Answer ..... [1]

(b) $3 \times f \times 2 \times f$.

Answer ..... [1]

6 When written as a product of their prime factors,

$$x = 2^3 \times 3^9,$$
$$y = 2 \times 3^2 \times 5,$$
$$z = 2^2 \times 3 \times 7.$$

Find

(a) the value of the cube root of x,

Answer ..... [1]

(b) the LCM of x, y and z, giving your answer as the product of its prime factors,

Answer ..... [1]

(c) the greatest number that will divide x, y and z exactly.

Answer ..... [1]

7 **(a)** Round off 0.8219 to

(i) the nearest integer,

Answer ..... [1]

(ii) 2 decimal places.

Answer ..... [1]

(b) By rounding each number to 1 significant figure, estimate the value of $\frac{3.94 \times 3.14}{4.11}$.

You must show your working.

Answer ..... [2]

8 Solve the following equations.

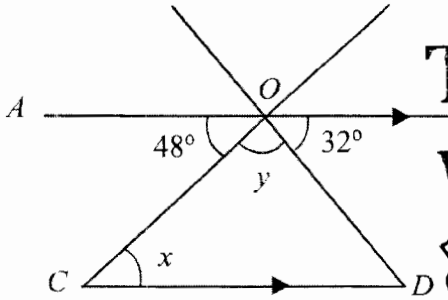
(a) $x - 2 = 8$

Answer $x =$ ..... [1]

(b) $\frac{4x}{3} = 1$

Answer $x =$ ..... [2]

9 In the diagram, AB and CD are parallel lines. Angle $AOC = 48°$ and angle $BOD = 32°$.
Find the value of



(a) x,

Answer $x =$ .....° [1]

(b) y.

Answer $y =$ .....° [2]

10 **(a)** Express 20 min : 1 h as ratios in their simplest forms.

Answer ..... : ..... [1]

(b) 800 children attended a funfair and 500 were boys.
Find

(i) the ratio of girls to boys,

Answer ..... : ..... [1]

(ii) the fraction of the total number of children were boys.

Answer ..... [1]

11 **(a)** Kelvin scored 44 out of 55 in a Mathematics Test.

What is the percentage of marks did he get?

Answer ..... % [1]

(b) Elma managed to sell 80% of the necklaces that she made. If she sold 240 necklaces, find the total number of necklaces she had made.

Answer ..... [2]

12 The first 4 terms of a sequence are 4, 7, 10, 13, ...

(a) Find the 6^{th} term.

Answer ..... [1]

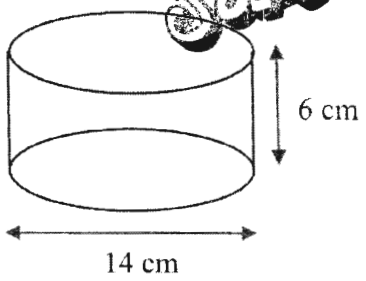
(b) The pth term in the sequence is 151.
Find p.

Answer $p =$ ..... [2]

13 The solid cylinder has a diameter 14 cm and height 6 cm.

Find

(a) the area of the base,



Answer ..... cm^2 [1]

(b) the total surface area.

Answer ..... cm^2 [2]

END OF SECTION A

Name	Index Number	Class

WOODGROVE SECONDARY SCHOOL

A COMMUNITY OF FUTURE-READY LEARNERS AND THOUGHTFUL LEADERS

END-OF-YEAR EXAMINATION 2023

LEVEL & STREAM : SECONDARY 1 NORMAL (ACADEMIC)

SUBJECT (CODE) : MATHEMATICS SYLLABUS A (4045)

DATE (DAY) : 11 OCTOBER 2023 (WEDNESDAY)

DURATION : 2 HOURS (FOR SECTIONS A & B)

Section B

READ THESE INSTRUCTIONS FIRST

Write your name, index number and class on all the work you hand in.
Write in dark blue or black pen.
You may use a soft pencil for any diagrams, graphs, tables or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **ALL** the questions.
Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place in the case of angles in degrees, unless a different level of accuracy is specified in the question.
The use of an approved scientific calculator is expected, where appropriate.
You are reminded of the need for clear presentation in your answers.

The number of marks is given in brackets [ ] at the end of each question or part question.

There are 2 sections in this paper and the total number of marks is **70**.

SECTION B (35 MARKS)

DO NOT TURN OVER THE QUESTION PAPER UNTIL YOU ARE TOLD TO DO SO.

Student's Signature		**Parent's Signature**	
Date		**Date**	

35

14 Aiden cycles 4 km at an average speed of 12 km/h.

He then walks 0.8 km for 10 min.

Find, for the whole of Aiden's journey,

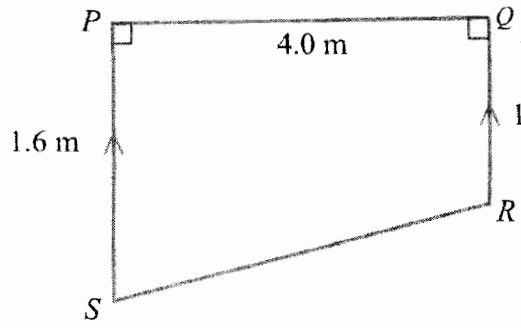
(a) the total time taken in hours,

Answer ..... hours [2]

(b) the average speed in km/h.

Answer ..... km/h [2]

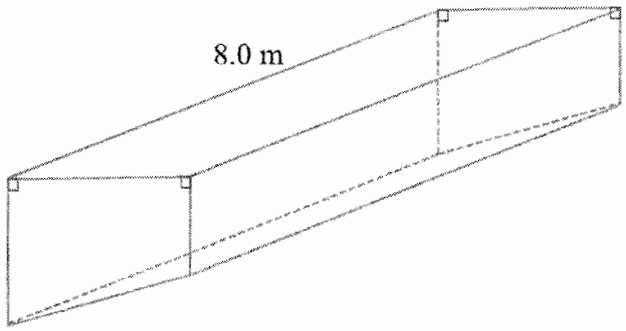
15 Trapezium $PQRS$ is the cross section of a swimming pool such that PS is parallel to QR.



(a) Calculate the area of trapezium $PQRS$.

Answer ..... m^2 [2]

Given also the length of the swimming pool is 8.0 m.



(b) Calculate, in m^3, the amount of water needed to fill the pool completely.

Answer ..... m^3 [2]

16 The table below shows the number of correct answers obtained by 20 pupils in a science quiz.

25	21	25	22	23
24	20	22	23	21
21	23	25	25	26
23	20	24	22	25

(a) Complete the table below using the information given. [2]

Number of correct answers	Tally	Number of pupils
20		
21		
22		
23		
24		
25		
26		
	Total	20

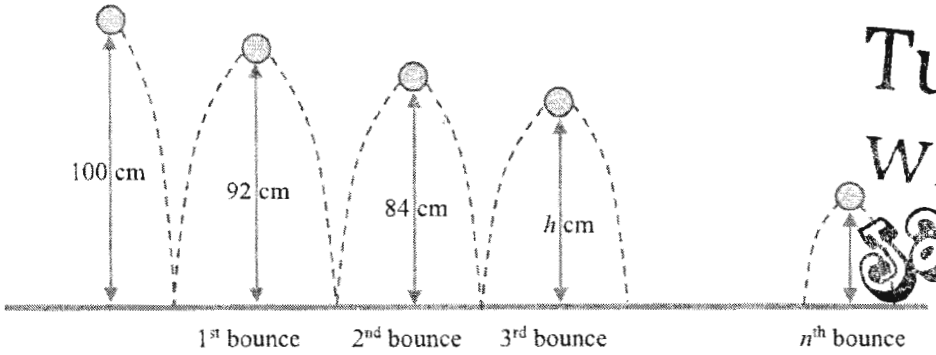
(b) Pupils who have 25 or more correct answers are given an "A" grade.
The Science teacher claims that 25% of the students achieved an "A" grade.

Do you agree with the claim? Justify your answer.

Answer

[2]

17 The diagram shows the bouncing of a ball when it is dropped onto the floor from a height of 100 cm.



(a) Write down the value of h.

Answer $h =$ ..... [1]

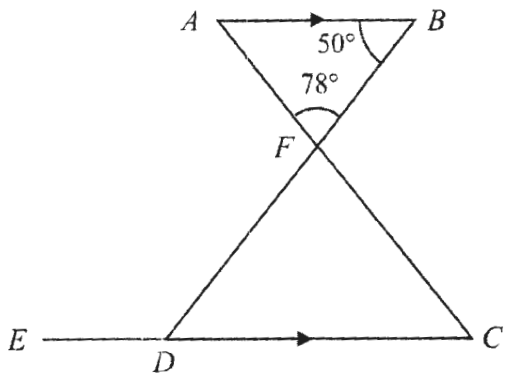
(b) Find the height of the ball after the 11^{th} bounce.

Answer ..... cm [2]

(c) Given T_n is the height of the ball after the nth bounce.
Express, in its simplest form, T_n in terms of n.

Answer $T_n =$ ..... cm [2]

18 In the diagram, AB is parallel to EC, angle $ABD = 50°$ and angle $AFB = 78°$. Lines AC and BD intersects at point F.



Stating the reasons clearly in your workings, find

(a) angle CFD,

Answer angle CFD = ... ° [1]

(b) angle ACD,

Answer angle ACD = ... ° [2]

(c) angle EDF.

Answer angle EDF = ... ° [2]

19 **(a)** Write down, in its simplest form, an algebraic expression for each of the following statements.

(i) Add 5 to x.

Answer ..... [1]

(ii) Subtract y from 24.

Answer ..... [1]

(b) Expand and simplify $4x+3(x-3)$.

Answer ..... [2]

(c) Solve

(i) $6m-5=2m+11$,

Answer $m=$ ..... [1]

(ii) $5n=4(n+2)$.

Answer $n=$ ..... [2]

20 Any student who joins the membership of a bookshop will have the privileges as follow:

10% off
for all purchase

Membership	1-year	3-year
New	$8	$20
Renewal	$8	$12

Jane intends to buy some books and stationeries which cost a total of $158. She **renews** a 3-year membership with the bookshop.

(a) Calculate the cost of the books and stationeries bought **after** joining the membership,

Answer $ ..... [2]

(b) The cost, in part (a), is inclusive of 8% GST, calculate the amount of GST paid.

Answer $ ..... [2]

(c) Jane claims that she would have saved $3.80 for the purchase **with** the renewal of a 3-year membership with the bookshop.

Do you agree? Justify your answer with full working.

Answer [2]

Woodgrove Secondary School
EOY Examination 2023
Mathematics Department
Sec 1N(A) EOY Marking Scheme Section A

Prepared by: Mdm Chong Fee Kim

Question No.		Marking Points	Marks Rewarded	Remarks
1		$\underset{\curvearrowright}{0.\dot{1}}, \underset{\curvearrowright}{0.101}, \underset{\curvearrowright}{\frac{1}{11}}, -0.1$	B2	B1 for 2 correct order links
2		$\frac{18\times1000}{1\times60\times60}$ $=\frac{18000}{3600}$ $=5$ m/s	M1 A1	
3	(a)	$150=2\times3\times5^2$	B1	
	(b)	$n=6$	B1	
4		$3a+b^2$ $=3(2)+(-1)^2$ $=6+1$ $=7$	 M1 A1	
5	(a)	$3c+2d-2c+4d$ $=c+6d$	 B1	
	(b)	$3\times f\times2\times f$ $=6f^2$	 B1	
6	(a)	$x=2^3\times3^9$, $\sqrt[3]{x}$ $=\sqrt[3]{2^3\times3^9}$ $=2\times3^3$ $=54$	 B1	
	(b)	LCM of x, y & $z=2^3\times3^9\times5\times7$	B1	
	(c)	HCF of x, y & z $=2\times3$ $=6$	 B1	
7	(a)(i)	1	B1	
	(a)(ii)	0.82	B1	
	(b)	$\frac{3.94\times3.14}{4.11}$ $\approx\frac{4\times3}{4}$ $=3$	 M1 A1	

8	(a)	$x-2=8$ $x=8+2$ $x=10$	B1	
	(b)	$\frac{4x}{3}=1$ $4x=3$ $x=\frac{3}{4}$	M1 A1	
9	(a)	$x=48°$ (alternate angles, AB // CD)	B1	Does not need to state reasons.
	(b)	$48°+y+32°=180°$(Adj. ∠s on a str. line) $y=180°-48°-32°$ $x=100°$ Or equivalent method of angle sum of triangle.	M1 A1	
10	(a)	20 : 60 =1 : 3	B1	
	(b)(i)	300 : 500 =3 : 5	B1	
	(b)(ii)	$\frac{500}{800}=\frac{5}{8}$	B1	
11	(a)	$\frac{44}{55}\times100\%=80\%$	B1	
	(b)	80% of necklaces = 240 100% of necklaces = $\frac{240}{80}\times100$ $=300$	M1 A1	
12	(a)	$T_6=4+3(6-1)$ $T_6=4+3(5)$ $T_6=19$	B1	
	(b)	$151=4+3p(n-1)$ $\quad 151-4=147$ $147=3(p-1)$ **Or** $\frac{147}{3}=49$ $49=p-1$ [M1] $\quad 49+1=50$ th [B2] $p=50$ [A1]	M1 A1 Or B2	
13	(a)	Area of the base $=\pi\left(\frac{14}{2}\right)^2$ $=154$ cm^2(3 sig. fig.)	B1	
	(b)	Total surface area $=2\pi\left(\frac{14}{2}\right)^2+2\pi\left(\frac{14}{2}\right)(6)$ $=572$ cm^2(3 sig. fig.)	M1 A1	

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Section B

Marking Scheme

Mathematical Formulae

Compound interest

$$\text{Total amount} = P\left(1+\frac{r}{100}\right)^n$$

Mensuration

Curved surface area of a cone $= \pi rl$

Surface area of a sphere $= 4\pi r^2$

$$\text{Volume of a cone} = \frac{1}{3}\pi r^2 h$$

$$\text{Volume of a sphere} = \frac{4}{3}\pi r^3$$

$$\text{Area of triangle } ABC = \frac{1}{2}ab\sin C$$

Arc length $= r\theta$, where θ is in radians

$$\text{Sector area} = \frac{1}{2}r^2\theta \text{ , where } \theta \text{ is in radians}$$

Trigonometry

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc\cos A$$

Statistics

$$\text{Mean} = \frac{\Sigma fx}{\Sigma f}$$

$$\text{Standard deviation} = \sqrt{\frac{\Sigma fx^2}{\Sigma f} - \left(\frac{\Sigma fx}{\Sigma f}\right)^2}$$

14 Aiden cycles 4 km at an average speed of 12 km/h.

He then walks 0.8 km for 10 min.

Find, for the whole of Aiden's journey,

(a) the total time taken in hours,

Cycle: Time taken $= \frac{4}{12}$ h $= \frac{1}{3}$ h Walk: Time taken $= \frac{10}{60}$ h $= \frac{1}{6}$ h	B1
Total time taken $= \frac{1}{3} + \frac{1}{6}$ h $= \frac{1}{2}$ h	A1

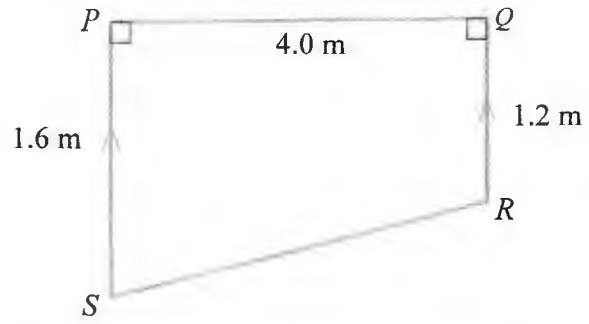
Answer ..... hours [2]

(b) the average speed in km/h.

Total distance $= 4 + 0.8$ $= 4.8$ km	M1
Average speed $= \frac{4.8}{0.5}$ $= 9.6$ km/h	A1

Answer ..... km/h [2]

15 Trapezium $PQRS$ is the cross section of a swimming pool such that PS is parallel to QR.

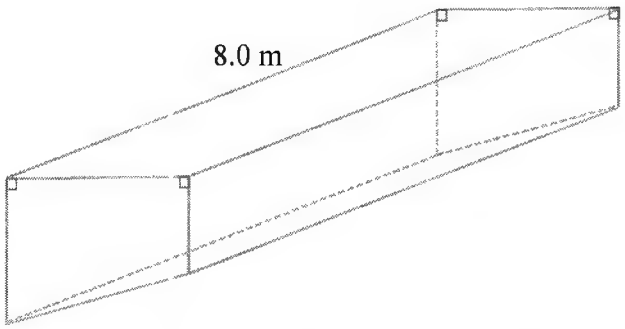


(a) Calculate the area of trapezium $PQRS$.

Area of trapezium $= \frac{1}{2}(1.6+1.2)\times 4.0$	M1
$= 5.6\ m^2$	A1

Answer ..... m^2 [2]

Given also the length of the swimming pool is 8.0 m.



(b) Calculate, in m^3, the amount of water needed to fill the pool completely.

Amount of water = volume of prism	
= Area of trapezium × length	
$= 5.6 \times 8.0$	M1
$= 44.8\ m^3$	A1

Answer ..... m^3 [2]

16 The table below shows the number of correct answers obtained by 20 pupils in a science quiz.

25	21	25	22	23
24	20	22	23	21
21	23	25	25	26
23	20	24	22	25

(a) Complete the table below using the information given. [2]

Number of correct answers	Tally	Number of pupils
20	//	2
21	///	3
22	///	3
23	////	4
24	//	2
25	~~////~~	5
26	/	1
	Total	20
	B1	B1

(b) Pupils who have 25 or more correct answers are given an "A" grade.
The Science teacher claims that 25% of the students achieved an "A" grade.

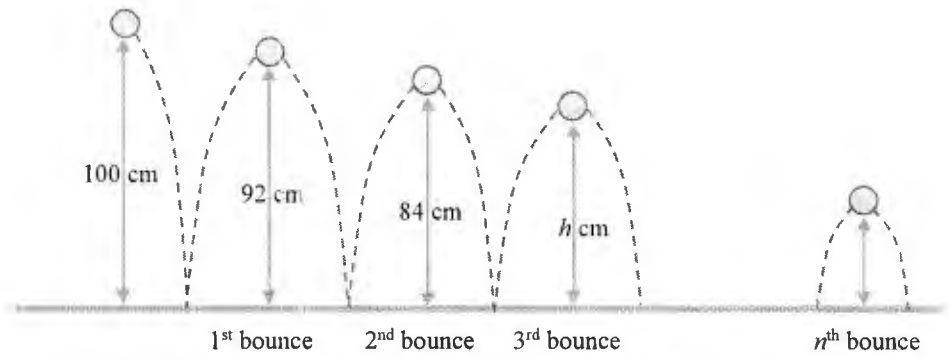
Do you agree with the claim? Justify your answer.

Answer

$\%\ (\geqslant 25) = \frac{6}{20} \times 100\%$ $= 30\%$ $\neq 25\%$	M1
Hence, I **disagree** with the claim.	A1

[2]

17 The diagram shows the bouncing of a ball when it is dropped onto the floor from a height of 100 cm.



(a) Write down the value of h.

$h = 84 - 8$ $= 76$	B1

Answer $h =$ ..... [1]

(b) Find the height of the ball after the 11^{th} bounce.

height $= 100 - 8 \times 11$	M1
$= 12$ cm	A1
Or	
Height $= 100 - 8 - 8 - 8 - 8 - 8 - 8 - 8 - 8 - 8 - 8 - 8$	M1
$= 12$ cm	A1

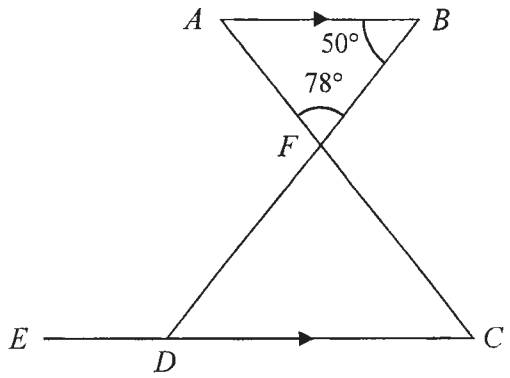
Answer ..... cm [2]

(c) Given T_n is the height of the ball after the nth bounce.
Express, in its simplest form, T_n in terms of n.

$T_n = 92 - 8(n - 1)$	M1
$= 92 - 8n + 8$	
$= 100 - 8n$	A1

Answer $T_n =$ ..... cm [2]

18 In the diagram, AB is parallel to EC, angle $ABD = 50°$ and angle $AFB = 78°$. Lines AC and BD intersects at point F.



Stating the reasons clearly in your workings, find

(a) angle CFD,

$\angle CFD = 78°$ (Vert. opp. $\angle$s)	B1

Answer angle CFD = ... ° [1]

(b) angle ACD,

$\angle BDC = \angle ABD = 50°$ (Alt. $\angle$s)	
$\angle ACD = 180° - 78° - 50°$ (sum of $\angle$s in a triangle)	M1
$= 52°$	A1

Answer angle ACD = ... ° [2]

(c) angle EDF.

$\angle EDF = 78° + 52°$	(Ext. $\angle$)	M1
$= 130°$		A1
or		
$\angle CDA = 50°$	(Alt. $\angle$s)	M1
$\angle EDF = 180° - 50°$	(Sum of $\angle$s on a str. line)	
$= 130°$		A1

Answer angle EDF = ... ° [2]

19 **(a)** Write down, in its simplest form, an algebraic expression for each of the following statements.

(i) Add 5 to x.

Answer ..... $x+5$ ..... [1]

(ii) Subtract y from 24.

Answer ..... $24-y$ ..... [1]

(b) Expand and simplify $4x+3(x-3)$.

$4x+3(x-3) = 4x+3x-9$	M1
$= 7x-9$	A1

Answer ..... [2]

(c) Solve

(i) $6m-5=2m+11$,

$6m-5=2m+11$	
$4m=16$	
$m=4$	B1

Answer $m=$ ..... [1]

(ii) $5n=4(n+2)$.

$5n=4(n+2)$	
$5n=4n+8$	M1
$n=8$	A1

Answer $n=$ ..... [2]

20 Any student who joins the membership of a bookshop will have the privileges as follow:

10% off
for all purchase

Membership	1-year	3-year
New	\$8	\$20
Renewal	\$8	\$12

Jane intends to buy some books and stationeries which cost a total of \$158. She **renews** a 3-year membership with the bookshop.

(a) Calculate the cost of the books and stationeries bought **after** joining the membership,

$\text{Cost} = \frac{90}{100} \times \$158$	M1
$= \$142.20$	A1

Answer \$ ..... [2]

(b) The cost, in part (a), is inclusive of 8% GST, calculate the amount of GST paid.

$\text{Amount of GST} = \frac{8}{108} \times \$142.20$	M1
$= \$10.53$	A1

Answer \$ ..... [2]

(c) Jane claims that she would have saved \$3.80 for the purchase **with** the renewal of a 3-year membership with the bookshop.

Do you agree? Justify your answer with full working.

Answer [2]

Without renewal: cost = \$158 With renewal : cost = \$142.20 + \$12 = \$154.20	M1
Amount saved = \$158 − \$154.20 = \$3.80 Hence, I **agree** with the claim.	A1

END OF PAPER