Name:_____ ( ) *(Write in BLOCK letters.)*	Class: S1____TG____

SERVE·LEAD·EXCEL

GREENDALE SECONDARY SCHOOL
End-of-Year Examination 2021

MATHEMATICS

Paper 1 — 4 October 2021

Secondary 1 Express — **1 hour**

Candidates answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

Write your index number and name in the spaces at the top of this page.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.

Target Before:

Target After:

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.

The total number of marks for this paper is **40**.

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Strand	N1	N1	N5	G1	N10	G1	G5	G1	N2	N5	N5	N3	N1	N7
Marks														

Total Marks	

This document consists of **13** printed pages, including this cover page.

Mathematical Formulae

Compound interest

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

Mensuration

$$\text{Curve surface area of a cone} = \pi rl$$

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

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

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

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

$$\text{Arc length} = r\theta, \text{ where } \theta \text{ is in radians}$$

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

Trigonometry

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

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

Statistics

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

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

For Examiner's Use Only

Answer **all** the questions.

1 **(a)** Calculate $\dfrac{2.05^4 + \dfrac{2}{7}}{\sqrt{1.2 - \dfrac{3}{8}}}$.

Write down the first five digits of your answer.

Answer _____ [1]

(b) Write your answer to **part (a)** correct to 2 significant figures.

Answer _____ [1]

---

2 $\dfrac{1}{32}$, 3π, -0.32^2, $0.\dot{3}\dot{2}$

(i) Write the above numbers in order of size, starting with the **smallest**.

Answer _____, _____, _____, _____ [1]
Smallest *Largest*

(ii) From the list above, write down the irrational number.

Answer _____ [1]

For Examiner's Use Only

3 Given that $a = 2$, $b = -7$ and $c = 5$, find the value of $\dfrac{-b - \sqrt{b^2 - 4ac}}{2a}$.

Answer _____ [2]

---

4 The interior angle of a regular polygon is 156°.

Calculate the number of sides of the polygon.

Answer _____ [2]

For Examiner's Use Only

5 Peter saves $4200 with a bank that gives a simple interest of 1.18% per annum.

Calculate the amount of money he would have at the end of 4 years.

Answer $ _____ [2]

For Examiner's Use Only

6 Construct a triangle PQR where $QR = 10.5$ cm and $\angle QPR = 70°$.

PQ has been drawn below. [2]

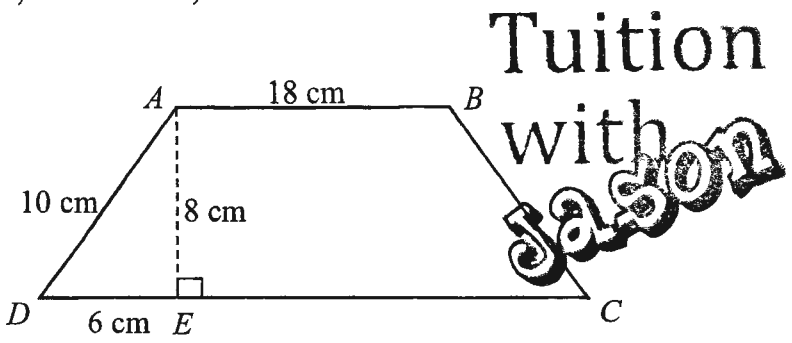
Answer:

P Q

For Examiner's Use Only

7 In the figure below, $ABCD$ is a trapezium.

$AB = 18$ cm, $AD = 10$ cm, $DE = 6$ cm and $AE = 8$ cm.

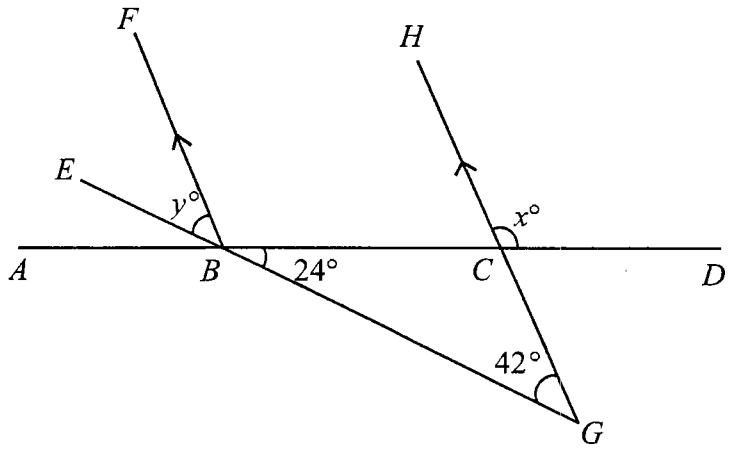


Given that the area of the trapezium $ABCD$ is 176 cm^2, find the length of EC.

Answer _____ cm [2]

For Examiner's Use Only

8 In the diagram below, $ABCD$ and EBG are straight lines. BF and GH are parallel lines. $\angle CBG = 24°$ and $\angle BGC = 42°$.



Find the value of

(a) x,

Answer _____° [1]

(b) y.

Answer _____° [1]

For Examiner's Use Only

9 Express each of the following ratios in its simplest form.

(a) 2.4 kg : 18 g

Answer _____ : _____ [1]

(b) $2.5 : 6\frac{1}{4} : 2$.

Answer _____ : _____ : _____ [2]

---

10 Factorise completely $3h(5f-3)-6k(3-5f)$

Answer _____ [3]

For Examiner's Use Only

11 **(a)** Simplify $\frac{1}{3}a+2b-\frac{3}{4}a+b$

Answer _____ [1]

(b) Expand and simplify $8u-4(2u+v-3w)$.

Answer _____ [2]

For Examiner's Use Only

12 (a) Express 1 hour 15 minutes as a percentage of 5 hours.

Answer _____% [2]

(b) An unknown number y is increased by 60%, and then decreased by 20%. Find the percentage change in y from its original value.

Answer _____% [3]

For Examiner's Use Only

13 (a) Use prime factors to explain why 48×75 is a perfect square.

Answer:

[3]

(b) The number $360k$ is a perfect cube.

Find the smallest positive integer value of k.

Answer $k =$ _____ [2]

For Examiner's Use Only

14 Solve the following equations.

(a) $15x - 3 = 6x + 15$

Answer $x =$ _____ [2]

(b) $\frac{2(y-3)}{3} + \frac{3y-1}{2} = -3(y-1)$

Answer $y =$ _____ [3]

- End of Paper -

Name:_____ ( ) (Write in BLOCK letters.)	Class: S1___ TG__

SERVE·LEAD·EXCEL

GREENDALE SECONDARY SCHOOL
End-Of-Year Examination 2021

MATHEMATICS

Paper 2 — 11 October 2021

Secondary 1 Express — **1 hour**

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Question	Q1	Q2	Q3a	Q3b	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Marks	3	4	2	3	2	3	3	3	7	3	7
Strands	N1	G1	N1	N5	N2	N4	N4	N3	N6	N5	G5

Total Marks:	

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Answer **all** the questions.

1 Benjamin has 60 bottles of lemon tea, 210 chocolate waffles and 270 peaches. He places all the refreshments at the booths such that each booth has identical amounts of refreshments.

Find

(a) the maximum number of booths,

Answer _____ booths [2]

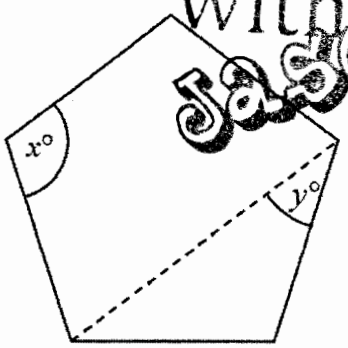
(b) the number of each type of refreshment at a booth.

Answer _____ lemon tea

Answer _____ chocolate waffles

Answer _____ peaches [1]

2 The diagram shows a **regular** pentagon.



Calculate

(a) x,

Answer $x =$ _____ [2]

(b) y.

Answer $y =$ _____ [2]

3 **(a)** By rounding off each number to a value that is most appropriate, estimate, **without the use of calculator**, the value of $\dfrac{5+\sqrt{9.10}}{\sqrt[3]{508}}$.

Answer _____ [2]

(b) **(i)** Factorise $x-xy$ completely.

Answer _____ [1]

(ii) **Hence**, find the value of $100-100(0.9)$.

Answer _____ [2]

4 For safety reasons, each bag that is checked-in before the flight must not exceed 28 kg.

Jane's bag weighs 30 kg. She removes some items from her bag so that the ratio of the new weight to the original weight of her bag is 5 : 6.

Can Jane check-in her bag for the flight?
Justify your answer clearly with workings.

Answer

[2]

---

5 A car travels at an average speed of 84 km/h for $\frac{1}{4}$ hours.

It then takes 30 minutes to travel the next 27 km.

Calculate the average speed for the **total** journey.
Give your answer in km/h.

Answer _____ km/h [3]

---

6 Meng wraps 8 presents in 2 hours.

Wei wraps 15 presents in $2\frac{1}{2}$ hours.

If both Meng and Wei work together, how long do they take to wrap 74 presents?

Answer _____ hours [3]

---

7 40% of $\frac{1}{2}$ is the same as a% of $8b$.

Find ab.

Answer ab = _____ [3]

---

8 The table shows the values of x and y from the graph of $y = 2x - 7$.

x	-1	1	2	4
y	-9	-5	-3	p

(a) Find the value of p.

Answer $p =$ _____ [1]

(b) Using a scale of 2 cm to 1 unit, draw a horizontal x-axis for $-1 \leq x \leq 4$.
Using a scale of 2 cm to 1 unit, draw a vertical y-axis for $-9 \leq y \leq 1$.
Draw the graph of $y = 2x - 7$. [2]
[Answer this part of the question on the graph paper on the next page.]

(c) **From the graph**, find value of y when $x = 0$.

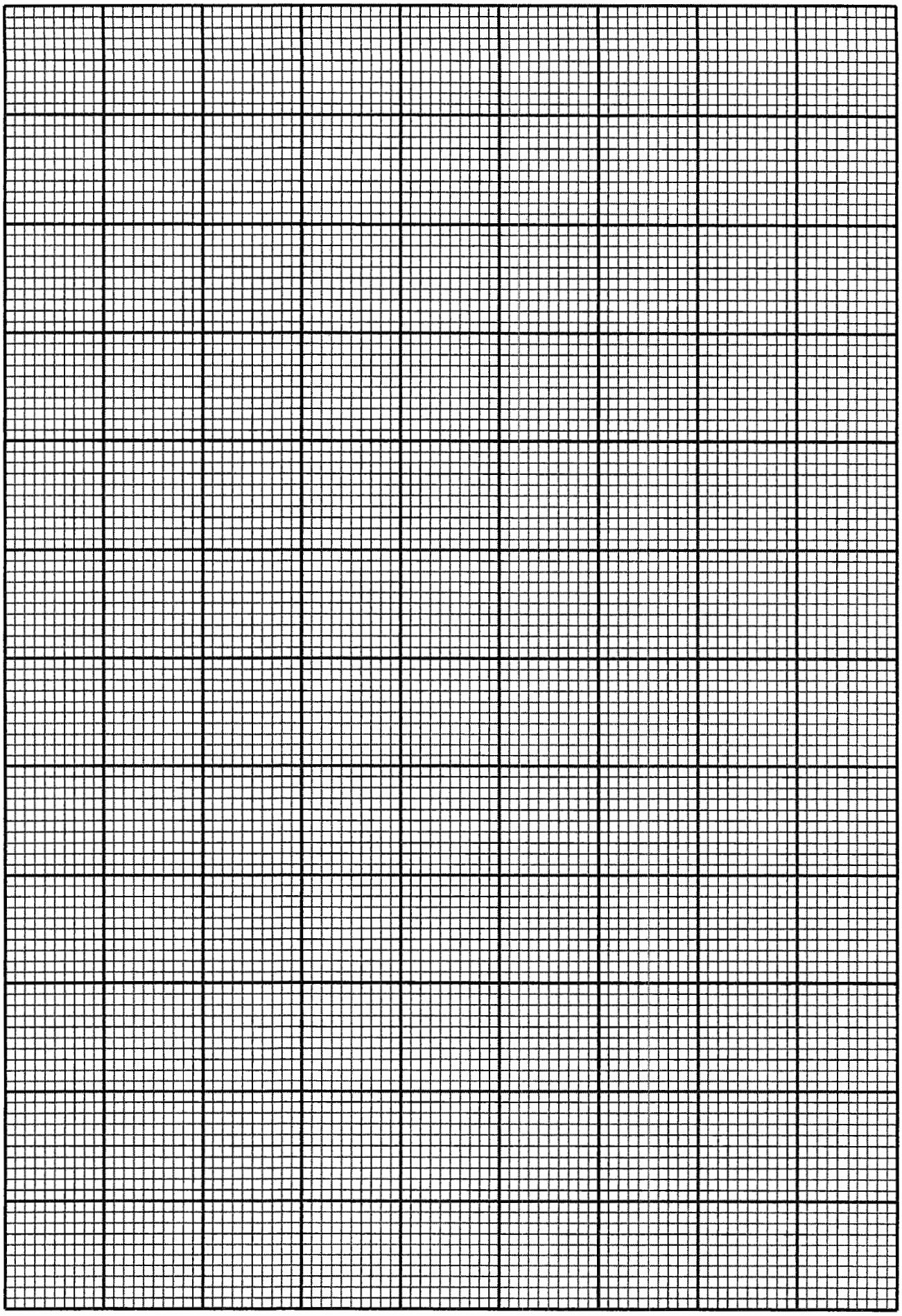
Answer $y =$ _____ [1]

(d) Find the gradient of the line.

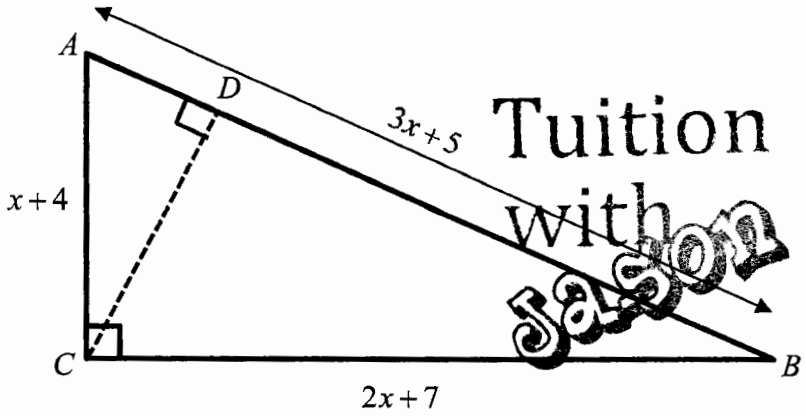
Answer _____ [1]

(e) The graph of $y = 2x - 7$ and $x = 3$ intersect at a point.
By drawing the line $x = 3$, write down the coordinates of the point of intersection.

Answer (..... , ...) [2]



9 The triangle shows triangle ABC in which angle $ACB = 90°$, $AB = 3x + 5$ cm, $BC = 2x + 7$ cm, and $AC = x + 4$ cm.



Given that $x = 4$,

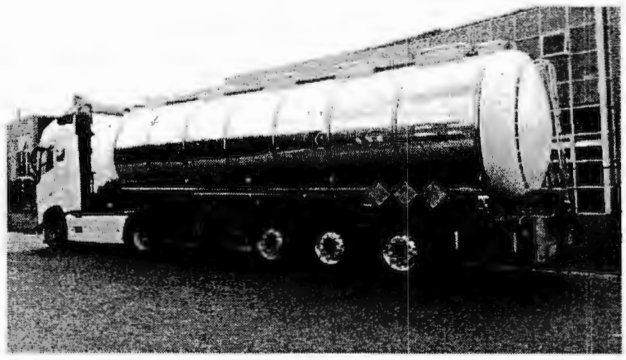
(a) find the area of triangle ABC,

Answer _____ cm^2 [1]

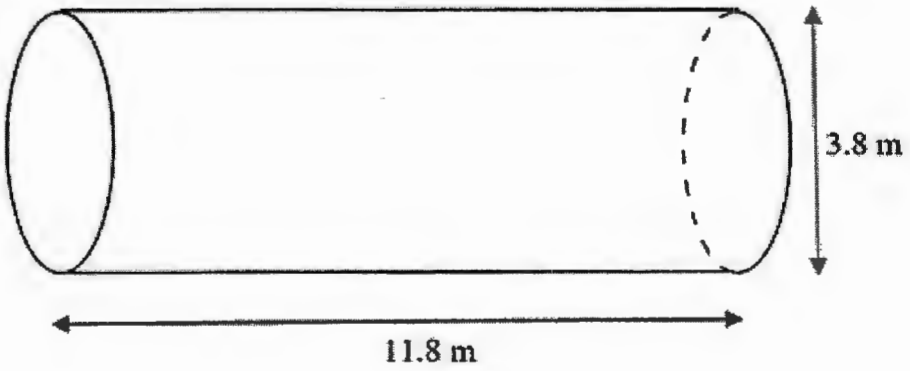
(b) hence find CD.

Answer _____ cm [2]

10 An oil tanker is used to transport different types of fuel such as crude oil.



In this question, the tank on the trailer can be modelled as a cylinder with length 11.8 m and diameter 3.8 m.



For safety reasons, the tank can only be filled to a maximum of 80% of its capacity.

(a) Calculate the volume of the tank, in cubic metres, giving your answer to 1 decimal place.

Answer _____ m^3 [2]

(b) Hence, find the maximum amount of fuel that can be loaded into the tank.

Answer _____ m^3 [2]

(c) The **entire** fuel tank is to be painted.
A tin of paint can cover 9500 cm^2 of external surface of the tank.

Peter claims that he must buy 172 tins to paint the entire tank.
Is his claim true?
Justify your answer with working shown clearly.

Answer [3]

– End of Paper –

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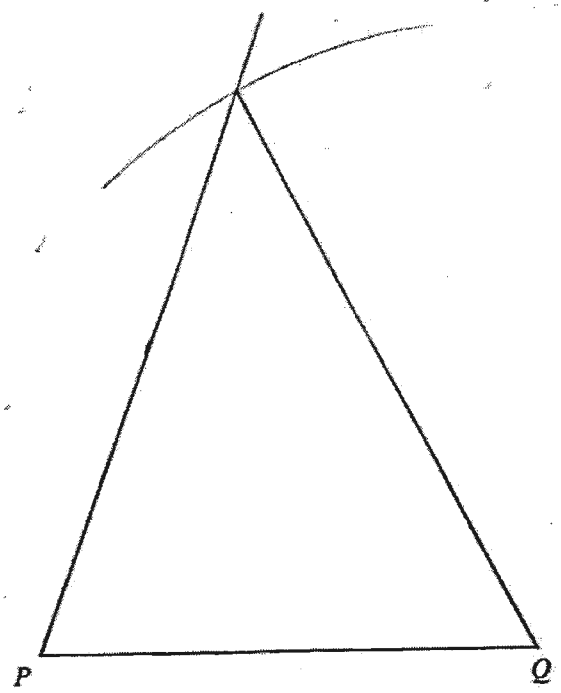
1E EOY Marking Scheme Paper 1 2021

Qn	Solutions	Marks
1(a)	19.758	B1
1(b)	20	B1
		2m
2(a)	-0.32^2, $\frac{1}{32}$, $0.\dot{3}\dot{2}$, 3π	B1
(b)	3π	B1
		2m
3	$\frac{-(-7)-\sqrt{(-7)^2-4(2)(5)}}{2(2)}$ $=\frac{7-\sqrt{9}}{4}$ $=1$	B1 B1
		2m
4	number of sides $=\frac{360°}{180°-156°}$ $=15$ sides OR $\frac{(n-2)\times 180}{n}=156$ $180n-360=156n$ $n=15$	 M1 A1 OR M1 A1
		2m
5	Interest for 4 years $=4200\times\frac{1.18}{100}\times 4$ $=\$198.24$ Amount of money $=\$4200+\$198.24$ $=\$4398.24$	 M1 A1
		2m

6		B1 (construction arc shown) B1 ($\angle QPR = 70°$ measured correctly)
		2m
7	$\frac{1}{2}(18+DC)(8)=176$ $18+DC=44$ $DC=26$ $EC=26-6$ $=20cm$	M1 A1
		2m
8(a)	$x=42°$ (corresponding angles, FB // HG)	B1
8(b)	$\angle BCD$ $=180°-24°-42°$ ($\angle$ sum of triangle) $=114°$ $y=114°$(vert. opp $\angle$s)	B1
	*No marks deducted if any of the reasons are not given/incorrect	**2m**
9(a)	400 : 3	B1
9(b)	2.5 : 6.25 : 2	

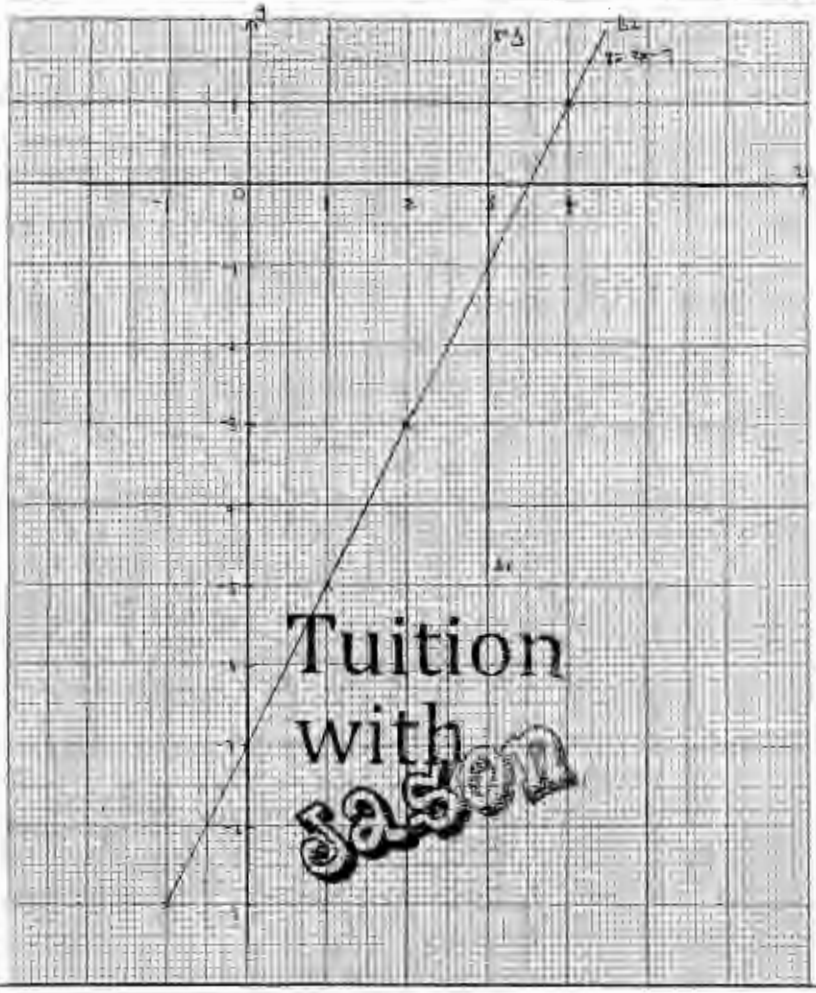
	$5 : 12.5 : 4$ $10 : 25 : 8$	M1 A1
		3m
10	$3h(5f-3)-6k(3-5f)$ $=3h(5f-3)+6k(5f-3)$ $=(3h+6k)(5f-3)$ $=3(h+2k)(5f-3)$	 M1 M1 A1
		3m
11(a)	$\frac{1}{3}a+2b-\frac{3}{4}a+b$ $=-\frac{5}{12}a+3b$	 B1
11(b)	$8u-4(2u+v-3w)$ $=8u-8u-4v+12w$ $=-4v+12w$	 M1 A1
		3m
12(a)	$\frac{1.25}{5}\times 100\%$ $=25\%$	M1 A1
12(b)	$160\% = 1.6y$ $\frac{80}{100}\times 1.6y$ $=1.28y$ Percentage change $=\frac{1.28y-y}{y}\times 100\%$ $=28\%$	M1 M1 A1
		5m
13(a)	$48=2^4\times 3$ $75=3\times 5^2$ $48\times 75=2^4\times 3^2\times 5^2$ Since the index of each prime factor is a multiple of 2, 48×75 is a perfect square.	M1 (both prime factorisation is correct) M1

	OR 48×75 $=3600$ $=2^4\times 3^2\times 5^2$ Since the index of each prime factor is a multiple of 2, 48×75 is a perfect square.	A1 OR M1 M1 A1
13(b)	$360=2^3\times 3^2\times 5$ $k=3\times 5^2$ $=75$	M1 A1
		5m
14(a)	$15x-3=6x+15$ $9x=18$ $x=2$	M1 A1
14(b)	$\frac{2(y-3)}{3}+\frac{3y-1}{2}=-3(y-1)$ $4(y-3)+3(3y-1)=-18(y-1)$ $4y-12+9y-3=-18y+18$ $13y-15=-18y+18$ $31y=33$ $y=\frac{33}{31}$ *or* $1\frac{2}{31}$ *or* 1.06 (3s.f.)	 M1 M1 A1
		5m

Suggested Marking Scheme (GDL 2021 1EXP P2)

1	a	$60 = 2^2 \times 3 \times 5$ $210 = 2 \times 3 \times 5 \times 7$ $270 = 2 \times 3^3 \times 5$ $HCF = 2 \times 3 \times 5 = 30$ Maximum number of booths is 30.	M1 (either 2 of the prime factorisation are correct) A1
	b	Lemon Tea $= \frac{60}{30} = 2$ Chocolate Waffles $= \frac{210}{30} = 7$ Peaches $= \frac{270}{30} = 9$	B1 (all three correct)
2	(a)	$x = \frac{180(5-2)}{5}$ $= 108$	M1 A1
	(b)	$y = \frac{180-108}{2}$ $= 36$	M1 A1
3	(a)	$\frac{5+\sqrt{9.10}}{\sqrt[3]{508}}$ $= \frac{5+\sqrt{9}}{\sqrt[3]{512}}$ $= \frac{5+3}{8}$ $= 1$	Correct approximation of $\sqrt{9.10} = \sqrt{9}$ $\sqrt[3]{508} = \sqrt[3]{512}$ (M1 – either one of the approximation is correct) A1
	(bi)	$x - xy = x(1-y)$	B1
	(bii)	$100 - 100(0.9)$ $= 100\,(1-0.9)$ $= 10$	M1 A1

4		New : Original 5 : 6 25 : 30 The new weight is 25 kg. Yes, Jane can check in her bag now as 25 is less than 28 kg.	 M1 A1
5		Distance = $=84\times\frac{1}{4}=21\ km$ Average speed = $=\frac{(21+27)km}{\left(\frac{1}{4}+\frac{1}{2}\right)hr}$ $=64\ km/h$	 M1 (for distance), M1 (for time) A1
6		Meng = 4 presents/hour Wei = $=\frac{15}{2.5}=6$ presents/hour In 1 hour, both can wrap $4+6=10$ presents. Time taken to wrap 74 presents = $=\frac{74}{10}=7.4$ hours	M1 (either 4 presents/hour or 6 presents/hour) M1 A1
7		$40\%\times\frac{1}{2}=a\%\times 8b$ $\frac{1}{5}=\frac{8ab}{100}$ $ab=2.5$	M1 $(40\%\times\frac{1}{2}=\frac{1}{5})$ M1 $(a\%\times 8b=\frac{8ab}{100})$ A1

8	(a)	$p=2(4)-7=1$	B1
	(b)		B1 (Scale) B1 (all points correctly plotted with a straight line drawn thru them)
	(c)	$y=-7$	B1
	(d)	Gradient = 2	B1
	(e)	$(3,-1)$	B1
9	(a)	$\frac{1}{2}(8)(15)$ $=60\ cm^2$	A1
	(b)	$60=\frac{1}{2}(h)(12+5)$ $h=7.06\ cm\ (3sf)$	M1 A1

10	(a)	$\pi(1.9)^2(3.8)$ $=42.598\pi$ $=133.8\,m^3\ (1dp)$	M1 A1
	(b)	$0.8\times 42.598\pi$ $=107.0604511\ m^3$ $=107\ m^3$	M1 A1
	(c)	Total surface area $=2\pi r^2+2\pi rh$ $=2\pi(1.9)^2+2\pi(1.9)(3.8)$ $=52.06\pi\ m^2$ $=163.55\,m^2$ Number of tins required $=\dfrac{52.06\pi}{0.95}$ $=172.16\ tins$ Hence Peter is incorrect.	M1 M1 A1