SPRINGFIELD SECONDARY SCHOOL

End-Of-Year Examination 2024

Secondary 1G3 Mathematics

STUDENT NAME	

CLASS		REGISTER NUMBER		

MATHEMATICS

4052

23 September 2024

2 hours

Candidates answer on the Question Paper.
No additional Materials are required.

READ THESE INSTRUCTIONS FIRST

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

Answer **all** the 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.
The total number of marks for this paper is 80.

For Examiner's Use	
Section A	**/40**
Section B	**/40**
Total	**/80**

Do not turn over this question paper until you are told to do so.

Section A (40 Marks)
Answer **all** the questions.

1 It is given that $R = q^2\left(\frac{1}{3} - p\right)$.

Find R when $q = 3$ and $p = -4$.

Answer $R =$ ..... [1]

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2 Write the following numbers in order of size, starting with the largest.

$$\frac{\pi}{4}, \quad \frac{\sqrt{3}}{2}, \quad 0.75\%, \quad \frac{3}{5}, \quad 0.57$$

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

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3 By writing each number correct to 2 significant figures, estimate the value of $\sqrt{\frac{20.19 \times 8.995}{44.995}}$. Show your working clearly.

Answer ..... [2]

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4 **(a)** The number of shoppers to Seng Supermart this month is reported as 230 000.
This value has been rounded to the nearest 10 000 .
Write down the smallest possible value of the number of shoppers.

Answer ..... [1]

(b) A newspaper reports that shoppers spent approximately \$10 million in a particular month in Seng Supermart.
The actual amount was \$9 650 504.70.
Is it good to estimate the amount to \$10 million as mentioned in the report?
State your reason clearly.

Answer.....

..... [1]

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5 Mr Goh wishes to buy a new car which is priced in the showroom at $128 000.
He trades in his old car for $52 500 as a deposit to pay for part of his new car.
He took out a loan to pay for his remaining amount from a finance company which charges simple interest at the rate of 2.8% per annum for 6 years.

(a) Calculate the interest he has to pay for the loan.

Answer $ ..... [3]

(b) Mr Goh will pay the loan through monthly installments over the 6 years.
Calculate the amount he has to pay to the finance company every month, giving your answer to the nearest cent.

Answer $ ..... [2]

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6 **(a)** Simplify $4y-3(10y-2x)$.

Answer ..... [2]

(b) Factorise completely $6ab-2ac+12a$.

Answer ..... [1]

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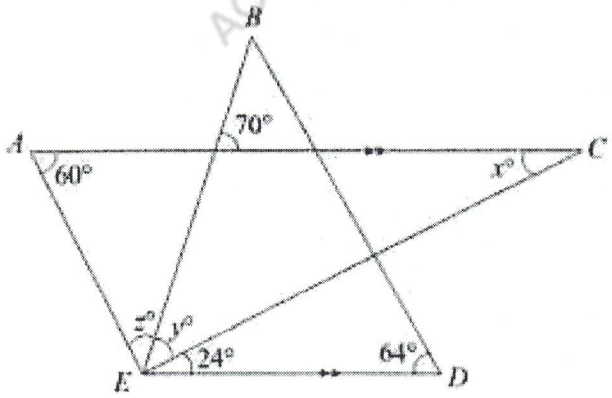
7 The diagram below shows two triangles BDE and ACE. AC is parallel to ED.



State your reasons clearly, find the value of

(a) x,

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

(b) y,

Answer $y =$ ..... [1]

(c) z.

Answer $z =$ ..... [1]

(d) Determine if AE is parallel to BD? Explain your answer with working.

Answer .....

.....

..... [2]

8 The number 168, written as a product of its prime factors, is $2^3 \times 3 \times 7$.

(a) Write 324 as the product of its prime factor.
Leave your answer in index notation.

Answer ..... [1]

(b) Find

(i) the highest common factor of both 168 and 324,

Answer ..... [1]

(ii) the smallest positive integer value of k for which $168k$ is a multiple of 324.

Answer $k =$ ..... [1]

(c) Explain why 324 is a perfect square.

Answer .....

..... [1]

9 Solve $5y-13=3(3y-2)$.

Answer $y =$ ..... [3]

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10 Express $\frac{3x}{2}-\frac{2x+5}{12}$ as a single fraction in its simplest form.

Answer ..... [3]

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11 Ms Melinda gave some sweets to Angel, Belinda and Celine in the ratio $3 : x : 5$.

Celine received 32 sweets more than Angel.

Belinda had 16 sweets less than Celine.

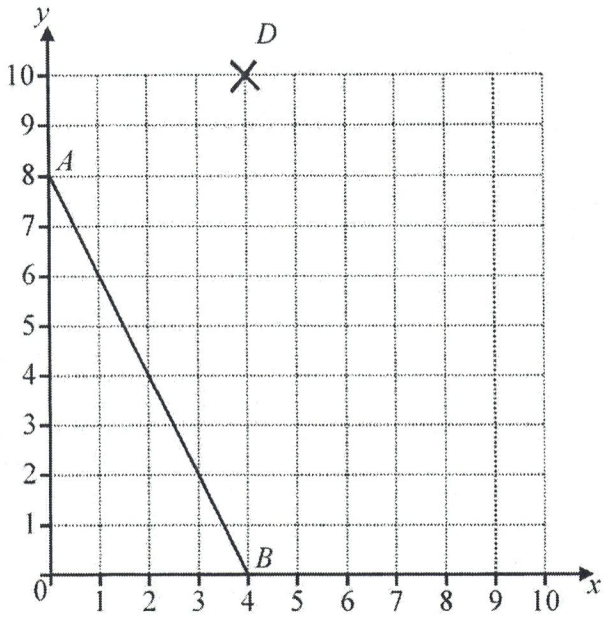
(a) Calculate the number of sweets Celine received.

Answer ..... [2]

(b) Calculate the value of x.

Answer ..... [2]

12 A straight line AB and a point D are drawn on the grid.
Point D has coordinates $(4,10)$.



(a) Find the gradient of the line AB.

Answer ..... [1]

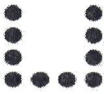
(b) Write down the equation of the line AB.

Answer ..... [1]

(c) By adding a point C such that $ABCD$ is a kite, complete drawing the kite in the diagram above. [1]

13 The diagram below shows the patterns formed by dots.

(a) On the answer space below, draw diagram number 4 of the sequence and write down the number of dots needed.

Diagram number, n	$n = 1$	$n = 2$	$n = 3$	$n = 4$
				
Total number of dots	4	7	10	

[2]

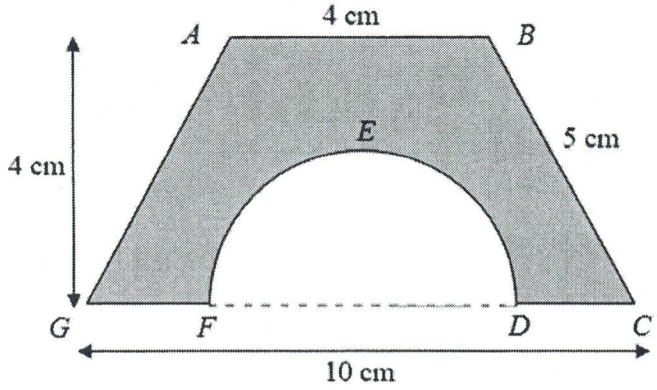
(b) The general term for the total number of dots sequence is $T_n = 2(n-1)^2$

Find the 100th term.

Answer ..... [1]

Section B (40 Marks)
Answer **all** the questions.

14 The diagram shows a trapezium $ABCD$ with height 4 cm, $AB = 4$ cm, $BC = AG = 5$ cm and $CG = 10$ cm.
A semicircle of radius 2 cm is removed from the trapezium.



Calculate

(a) the perimeter of the shaded region $ABCDEFG$,

Answer .....cm [2]

(b) the area of the shaded region $ABCDEFG$.

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

(c) Joan claims that the shaded area $ABCDEFG$ as a percentage of the area of the whole trapezium $ABCG$ is 80%.

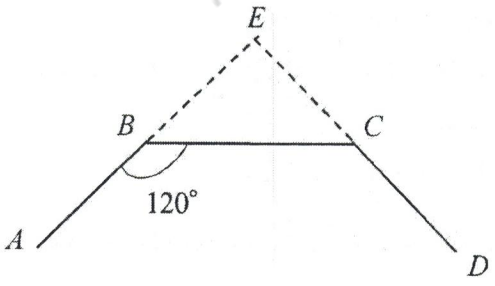
Is Joan correct?
Justify your answer by showing your working clearly.

Answer

.....

..... [2]

15 **(a)** In the figure, AB, BC and CD are three sides of a regular polygon, angle $ABC = 120^{\circ}$, AB and DC are produced to meet at E.



Find

(i) the number of sides of the polygon,

Answer ..... [2]

(ii) By finding angle EBC and angle BCE,
explain why triangle BEC is an equilateral triangle?
Show your working clearly

Answer .....

..... [2]

(b) A pentagon has interior angles of 96°, 80°, 50°, 46°, and $(x^{\circ} + 10^{\circ})$.
Find the value of x.

Answer $x =$ ..... [3]

16 Joyce is going to vist her grandfather at his house.

Joyce leaves her home and walks for 15 minutes to the bus stop.

The bus stop is 1 km away from her house.

The bus arrives immediately and she completes the rest of the journey by bus.

The bus travels at a speed of 50 km/h.

The total distance travelled by Joyce is 41 km.

(a) Find the speed of Joyce when she walks from her home to the bus stop.

Answer .....km/h [1]

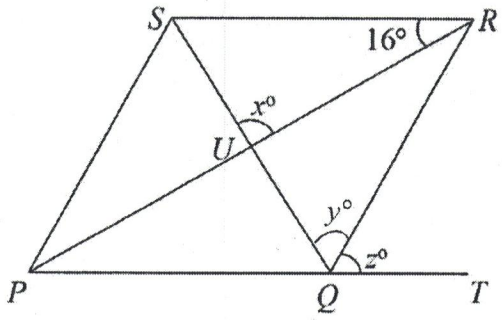
(b) Find the duration, in hours, for the bus journey.

Answer ..... h [2]

(c) Find the average speed, in km/h, that Joyce takes for the entire journey.
Leave your answers to 3 significant figures.

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

17 In the figure, $PQRS$ is a rhombus and PQT is a straight line.



State your reasons clearly, find

(i) x,

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

(ii) y,

Answer $y =$ ..... [2]

(iii) z,

Answer $z =$ ..... [2]

18 The price of an office chair is \$200 more than $\frac{1}{4}$ of the price of an Ergonomic chair.

A set of one office chair and two Ergonomic chairs cost \$1136.

Find the price of one office chair.

Answer \$..... [3]

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19 **(a)** Jason wants to go to the United Kingdom (UK) for a holiday. He converts 3360 Singapore dollars (S\$) to UK pounds (£).

The conversion rate is £1 = S\$1.68.

Find the amount, in pounds, that Jason receives.

Answer £..... [2]

(b) Jason spends £1000 in United Kingdom.
He decides to convert his remaining pounds to U.S. dollars (US\$) at a conversion rate of £1 = US\$1.30.

Find the amount in U.S. Dollars (US\$) that Jason receives.

Answer US\$..... [2]

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20 **(a)** $ABCD$ is a quadrilateral.
$BC = 7$ cm, $\angle ABC = 110°$, $AD = 9$ cm and $\angle BAD = 75°$.
AB is drawn below.

With the help of a pair of compasses, protractor and ruler, construct the quadrilateral $ABCD$.

Answer

[3]

(b) Measure and write the length of CD.

Answer CD = ...cm [1]

(c) Mark a point with an '×' within the quadrilateral $ABCD$ such that it is 3 cm away from B and 5 cm away from C. Label this point P. [1]

21 The variables x and y are connected by the equation $y = -5x + 4$
The table shows some corresponding values of x and y.

x	-1	0	2
y	p	4	-6

(a) Find the value of p.

Answer $p =$ ..... [1]

(b) Write down the gradient of $y = -5x + 4$.

Answer ..... [1]

(c) On the grid on **Page 18**, draw the graph of $y = -5x + 4$ for $-1 \leq x \leq 2$. [2]

(d) Use your graph to find the coordinates of the x-intercept.

Answer (..... , ...) [1]