GREENRIDGE SECONDARY SCHOOL
2024 END-OF-YEAR EXAMINATION
SECONDARY ONE

G3

CANDIDATE NAME

CLASS - INDEX NUMBER

G3 MATHEMATICS

4052

30 September 2024

2 hours 15 minutes

Candidates answer on the Question Paper.

Additional Materials: Nil

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 or graphs.
Do not use staples, paper clips, 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.
The total of the marks for this paper is 90.

For Examiner's Use	
Total	90

Section A
This section carries 45 marks.

1

$$2.7 \ , \ \pi \ , \ \sqrt[3]{9} \ , \ \frac{11}{5} \ , \ 0.0043$$

From the list of numbers above, state all the rational numbers.

Answer ..... [1]

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2 The highest temperature recorded in London was 40°C in July 2022.
The lowest temperature recorded in London was −16°C in January 1962.
Find the difference between the highest and the lowest temperatures.

Answer ..... [2]

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3 Factorise completely

(a) $-9x-3$,

Answer ..... [1]

(b) $3p^2q-12pq+6pq^2$,

Answer ..... [1]

(c) $3(v-w)-v(v-w)$.

Answer ..... [1]

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4 Written as a product of its prime factors, $720 = 2^4 \times 3^2 \times 5$.

(a) Express 1728 as a product of its prime factors, giving your answer in index notation.

Answer ..... [1]

(b) Find the smallest whole number that is divisible by both 720 and 1728.

Answer ..... [1]

(c) Given that $720k$ is a perfect square, write down the smallest possible integer value of k.

Answer ..... [1]

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5 Write as a single fraction in its simplest form $\frac{2x-3}{4} - \frac{x+1}{6}$.

Answer ..... [3]

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6 Solve $\frac{f+2}{5}+1=\frac{f+1}{2}$.

Answer $f=$ ..... [3]

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7 By rounding off each value to 1 significant figure, estimate $\sqrt{164.08-(2.978+7.003)^2}$.

Answer ..... [2]

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8 Every year, the value of a car depreciates by 15% of its value in the previous year.
If the value of the car is \$85 255 in 2024, find its value in 2022.

Answer \$ ..... [2]

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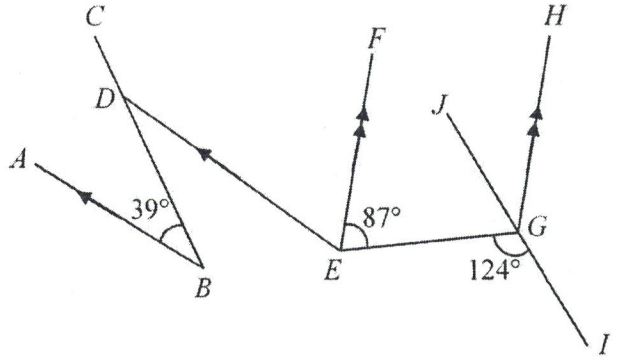
9 In the diagram, BC and IJ are straight lines. AB is parallel to DE and EF is parallel to GH. Angle $ABC = 39°$, angle $FEG = 87°$ and angle $EGI = 124°$.



Find

(a) angle CDE,

Answer ..... [2]

(b) angle HGI.

Answer ..... [2]

10 The price of a sofa set is $2700.
Mrs Chang pays a down payment of $540 and pays the remaining in monthly instalments over 1 year at a simple interest rate of 5% per annum.
Find the monthly instalment.

Answer $ ..... [3]

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11 A rectangle has dimensions 40 cm by 32 cm.
If the dimensions are increased by 25%, find

(a) the new length and breadth of the rectangle,

Answer Length = ... cm

Breadth = ... cm [2]

(b) the percentage increase in the area of the rectangle.

Answer ..... % [2]

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12 The first three terms in a number sequence are -5, -2 and 1.

(a) Find the next term in the sequence.

Answer ..... [1]

(b) Find an expression for the n^{th} term, in terms of n.

Answer ..... [1]

(c) Determine whether 1107 lies in this sequence. Justify your answer.

Answer .....

..... [2]

13 **(a)** Calculate the size of an interior angle of a regular hexagon.

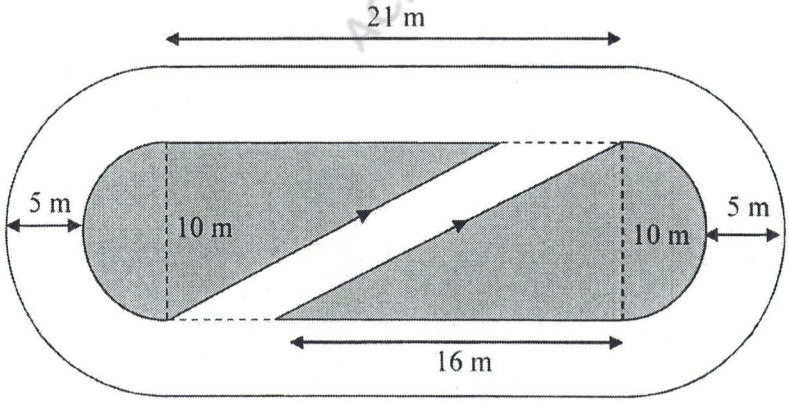
Answer ..... [2]

(b) John claims that the exterior angle of a regular polygon cannot be 25°.
Do you agree? Explain your answer.

Answer .....

..... [2]

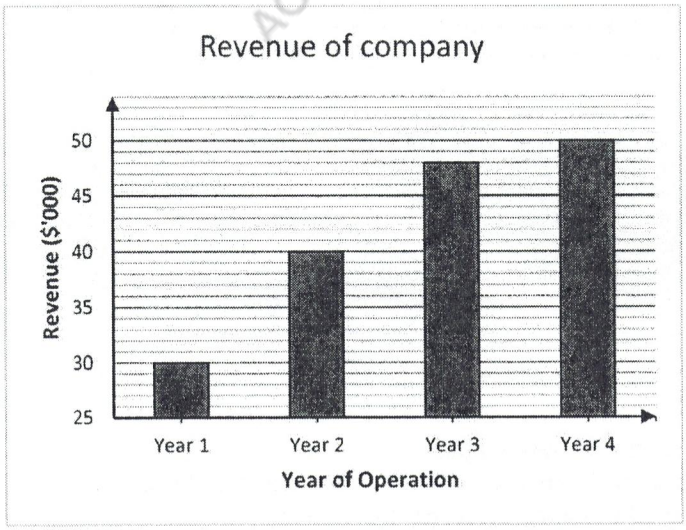
14



The diagram shows the layout of a park.
The shaded regions, made up of two identical semicircles of diameter 10 m and two identical right-angled triangles, represent the garden.
The outer unshaded region represents a 5 m wide cycling track.
The inner unshaded region in the shape of a parallelogram represents a pavement.
Calculate the total area of the cycling track and pavement.

Answer ..... m^2 [4]

15 The bar chart below shows the revenue of a company in its first four years of operation.



(a) Find the ratio of the revenue in Year 4 to the revenue in Year 1.

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

(b) State one aspect of the graph that may be misleading and explain how this may lead to a misinterpretation of the graph.

Answer .....

.....

.....

..... [2]

Section B

This section carries 45 marks.

1 **(a)** Write and simplify an algebraic expression for each of the following statements.

(i) Product of xy and $4xy$.

Answer ..... [1]

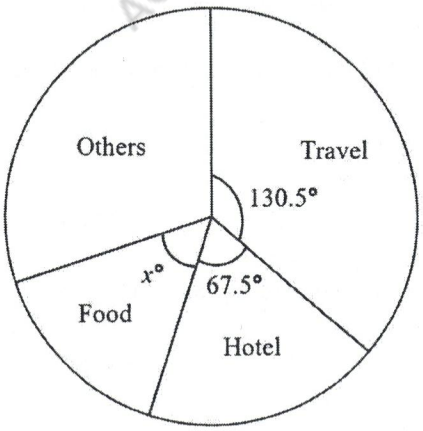
(ii) Subtract the square root of y from the cube of z.

Answer ..... [1]

(b) If $b = -2$, $c = -3$ and $d = 7$, find the **exact** value of $\dfrac{b - \sqrt{3d - 2b}}{c^2 + 2}$.

Answer ..... [2]

2 The pie chart below (not drawn to scale) shows the cost breakdown of a family's holiday.



(a) Given that \$1215 was spent on hotel, find the total cost of the holiday.

Answer \$ ..... [2]

(b) Given that the cost of hotel is \$243 more than the cost of food, find the value of x.

Answer x = ... [2]

(c) Express the amount spent on travel as a percentage of the total cost.

Answer ..... % [1]

3 A photocopier prints pages either in colour or in black and white.

(a) In x seconds, it prints 30 pages in colour.
Write down an expression, in terms of x, for the number of seconds it takes to print one page in colour.

Answer ..... s [1]

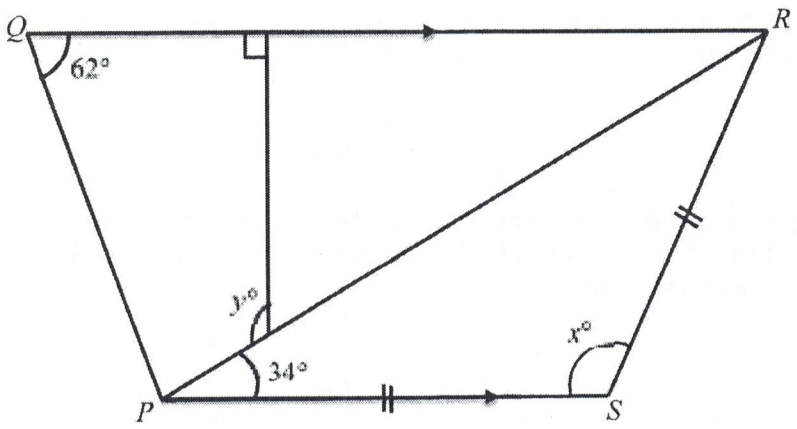
(b) In $(x + 2)$ seconds, it prints 10 more pages in black and white than it does in colour.
Write down an expression, in terms of x, for the number of seconds it takes to print one page in black and white.

Answer ..... s [1]

(c) Given that it takes 1 second longer to print a page in colour than it takes to print a page in black and white, form an equation in x and solve it to find the time taken to print a page in colour.

Answer ..... s [4]

4 $PQRS$ is a quadrilateral with PS parallel to QR.
$PS = SR$, angle $SPR = 34°$ and angle $PQR = 62°$.



(a) Write down the special name of quadrilateral $PQRS$.

Answer ..... [1]

(b) **Stating your reasons clearly**, find the values of

(i) x,

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

(ii) y.

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

5 **(a)** The top speed of Japan's Shinkansen bullet train is 320 km/h.
Express 320 km/h in m/s.

Answer ..... m/s [1]

(b) Karl cycled 105 km at an average speed of 35 km/h.
He rested for 30 minutes before continuing to walk for 2.5 hours at an average speed of 6 km/h. Find his average speed for the whole journey.

Answer ..... km/h [4]

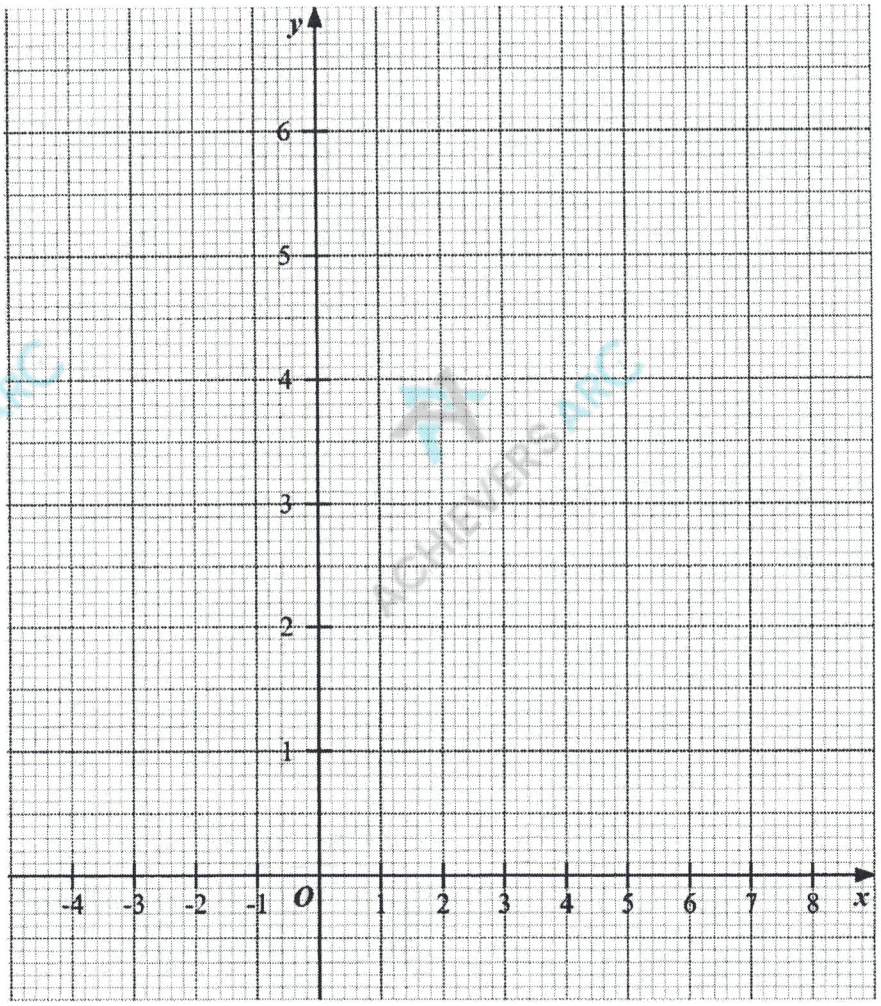
6 **(a)** Complete the table of values for $y = 4 - \frac{1}{2}x$.

x	–4	0	8
y		4	0

[1]

(b) On the grid, draw the graph of $y = 4 - \frac{1}{2}x$ for $-4 \leq x \leq 8$. [2]

Answer

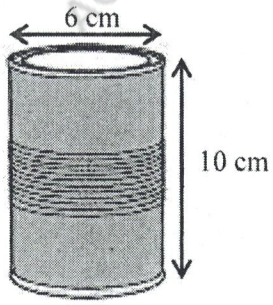


(c) On the same grid, draw a straight line $y = 1$. [1]

(d) Write down the coordinates of the point of intersection of the two lines.

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

7 The diagram shows a sealed cylindrical tin can with diameter 6 cm and height of 10 cm.



(a) Find the volume of the tin can (neglect the thickness).

Answer ..... cm^3 [2]

(b) Find the total surface area of the tin can.

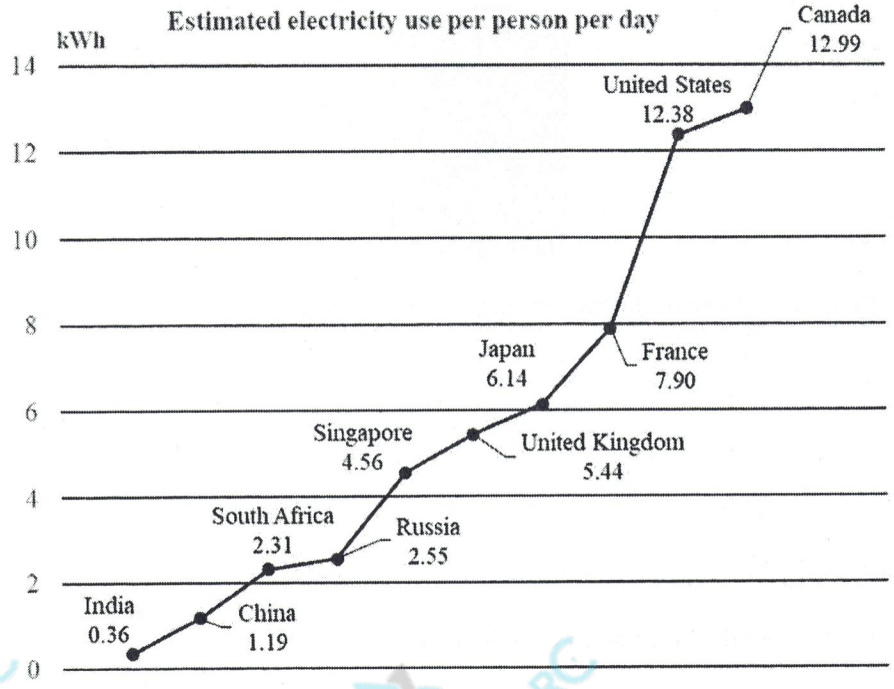
Answer ..... cm^2 [3]

(c) Mr Low wants to spray paint 80 of such cans.
The cost to spray paint an area of 10 cm^2 is \$0.03.
Given that Mr Low has \$60 in his wallet, will this amount be sufficient?
Explain your answer.

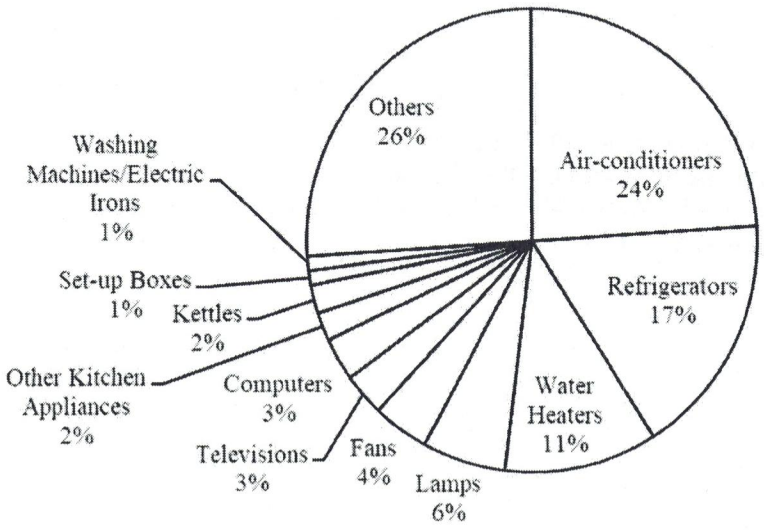
Answer .....

..... [3]

8 Below is some information about electricity use.



Percentage breakdown of electricity use for appliances in a typical Singapore household



(a) In Singapore, what is the estimated electricity use per person per day for refrigerators?

Answer ..... kWh [2]

(b) **(i)** Find the total electricity use per day for a typical Singapore household of 4 people.

Answer ..... kWh [2]

(ii) There are 4 people in the Tan family.
The percentage of electricity they use for air-conditioners is the same as the percentage for a typical Singapore household.
The Tan family uses an average of 19 kWh of electricity per day.

Mr Tan claims that if each person in the family reduces their air-conditioning use time from 8 hours to 6 hours, the family can get their total electricity use to below that of a typical Singapore household of 4 people.

Is Mr Tan correct? Explain your answer.

Answer ..... [3]

END OF PAPER