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Full Name	Class Index No	Class

Anglo-Chinese School (Barker Road)

END-OF-YEAR EXAMINATION 2024
SECONDARY ONE G3

MATHEMATICS
PAPER 1

1 HOUR 15 MINUTES

Candidates answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

Write your 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.

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

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 total of the marks for this paper is 50.

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.

For Examiner's Use

This document consists of **13** printed pages and **1** blank page.

1 Write these numbers in order of size, starting with the smallest.

$$-2\frac{5}{7},\quad -\sqrt{7.62},\quad 7.\dot{6},\quad \sqrt[3]{441}$$

Answer _____ (smallest) , _____ , _____ , _____ (largest) [2]

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2 The table shows the melting points and boiling points of mercury, iron and oxygen.

	Mercury	**Iron**	**Oxygen**
Melting point (°C)	–39	1540	– 218
Boiling point (°C)	357	2860	– 183

(a) Find the difference between the melting point and the boiling point of oxygen.

Answer _____ °C [1]

(b) Find the average of the melting points of mercury, iron and oxygen.
Give your answer correct to 1 decimal place.

Answer _____ °C [1]

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3 By writing each number correct to 2 significant figures, estimate the value of

$$\frac{\sqrt{81.42}+0.604}{\sqrt[3]{999}}.$$

Show your working.

Answer _____ [2]

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4 A tiger can reach a maximum speed of 65 km/h.
A lion can reach a maximum speed of 22.2 m/s.
Determine which animal is faster.
Show your working.

Answer The _____ is faster because _____

_____ [2]

5 The value of a diamond increases by 13.5% each year.
Its value at the beginning of 2021 was $3020.

(a) Find its value at the beginning of 2023.
Give your answer correct to the nearest ten dollars.

Answer $_____ [2]

(b) In 2021, Mr Lim paid $2793.50 for the diamond after a k % discount.
Find the value of k.

Answer k = _____ [2]

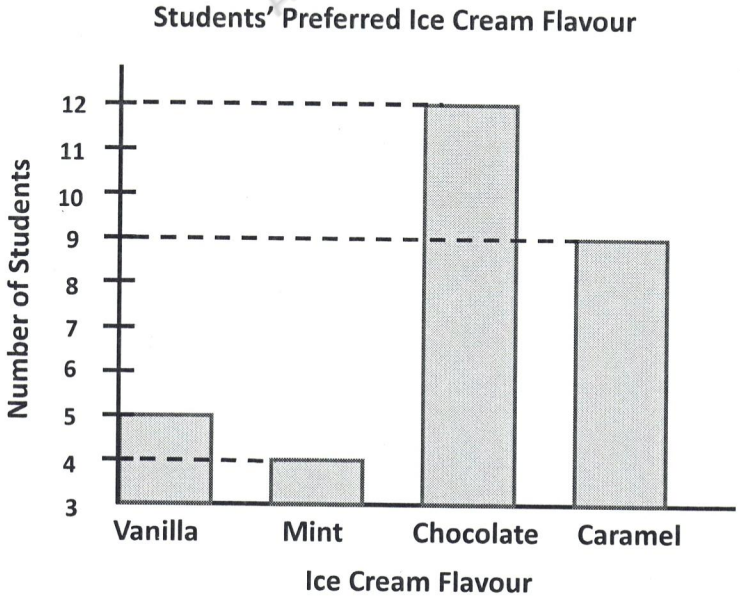
6 **(a)** Simplify $17 - 3(5x - 4)$.

Answer _____ [2]

(b) Given that $p = 64$, $q = 19$ and $r = -7$, evaluate $\dfrac{\sqrt[3]{p} - q - r^2}{4 \times \sqrt{p}}$.

Answer _____ [1]

7 A survey was conducted to find out the ice cream flavour that a group of Secondary 1 students preferred. The bar graph below shows the results.



(a) "The ratio of the number of students who preferred Caramel to the number of students who preferred Chocolate is 2 : 3."

Explain why this statement is false.

Answer This statement is false because _____

_____ [1]

(b) Explain how the graph misleads readers.

Answer _____

_____ [1]

(c) The results of the survey were also represented using a pie chart.
Find the angle of the sector that represents Chocolate.

Answer _____ [2]

_____

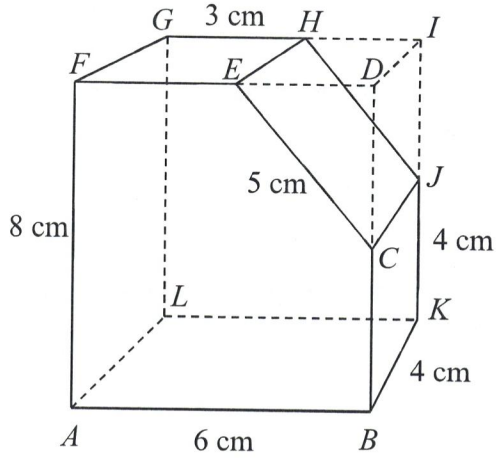
8 **(a)** Factorise completely $3x(4a-5b)-2y(5b-4a)$.

Answer _____ [2]

(b) Express as a single fraction in its simplest form $\frac{5y}{4}-\frac{3y+3}{8}$.

Answer _____ [2]

9 The diagram shows a solid made from a cuboid with a triangular prism sliced off from its top right corner.
$AB = 6$ cm, $BK = 4$ cm, $KJ = 4$ cm, $CE = 5$ cm, $HG = 3$ cm, $FA = 8$ cm



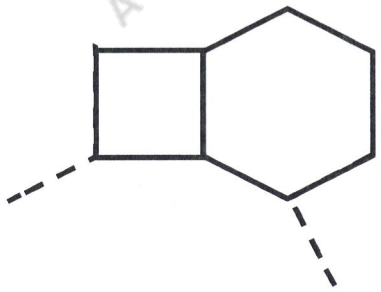
(a) Find the total external surface area of the solid.

Answer _____ cm^2 [3]

(b) Find the volume of the solid.

Answer _____ cm^3 [2]

10 The diagram shows a square tile, a regular hexagonal tile and part of a regular n-sided polygonal tile.



(a) Find the interior angle of the regular n-sided polygonal tile.

Answer _____ [2]

(b) Find the value of n.

Answer $n =$ _____ [2]

11 **(a)** **(i)** Written as a product of its prime factors, $3528 = 2^3 \times 3^a \times 7^b$.
Find the values of a and b.

Answer $a =$ _____ [1]

$b =$ _____ [1]

(ii) Find the smallest positive integer values of x and y such that

$\frac{3528y}{2^x \times 5}$ is a perfect square.

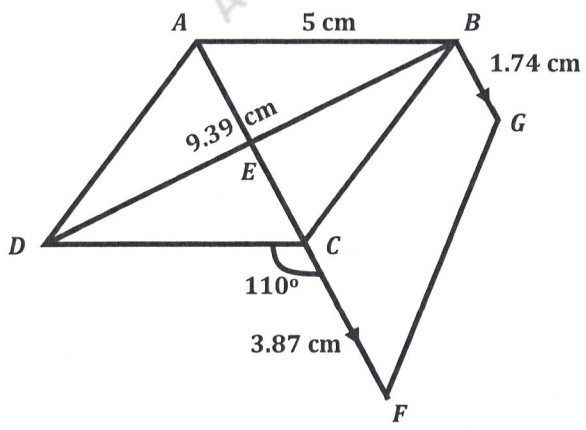
Answer $x =$ _____ [1]

$y =$ _____ [1]

(b) Alan has 120 one-centimetre cubes.
He arranges all the cubes into a cuboid.
The perimeter of the top of the cuboid is 20 cm.
Each side of the cuboid has a length greater than 3 cm.
Find the height of the cuboid.

Answer _____ cm [2]

12 In the diagram, $ABCD$ is a rhombus with sides 5 cm.
ACF is a straight line and CF is parallel to BG.
$DB = 9.39$ cm, $BG = 1.74$ cm, $CF = 3.87$ cm and angle $DCF = 110°$.



(a) (i) Find reflex angle DAB.
Give a reason for each step of your working.

Answer Reflex angle DAB = _____ [4]

(ii) Find angle ABG.

Answer Angle ABG = _____ [2]

(b) Calculate the area of trapezium $BGFC$, giving your answer correct to the nearest cm^2.

Answer _____ cm^2 [2]

13 The exchange rate between Singapore dollars ($) and Japanese yen (¥) is $1 = ¥ 81.
The exchange rate between South Korea won (₩) and Singapore dollars is
₩100 = $0.11.

(a) Aloysius is planning a trip to East Asia and found these hotel prices on a website.

Tokyo Hotel ¥ 10800 per night
Seoul Hotel ₩115000 per night

By using the exchange rates stated above, Aloysius concludes that it is cheaper to stay in Seoul Hotel per night than in Tokyo Hotel per night.
Show, with calculations, that he is correct.

Answer [2]

(b) In South Korea, the Goods and Services Tax (GST) rate is 10%.
A watch is sold for ₩204 000 inclusive of GST.
Find the price of the watch before GST.

Answer ₩ _____ [2]

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For Examiner's Use

1 **(a)** Ang borrows $9000 from the bank to pay for his polytechnic education tuition fee. The bank charges simple interest at a rate of 4.5% per annum.
Calculate the total amount he has to pay back to the bank at the end of 3 years.

Answer $ _____ [2]

(b) Devi's car has a petrol consumption of 7.5 litres per 100 km.

(i) Calculate the distance she can travel on a full tank of 90 litres.

Answer _____ km [1]

(ii) Petrol costs $1.85 per litre.
Calculate the amount Devi has to pay for a journey of 108 km.

Answer $ _____ [2]

2 The diagram shows a pattern formed using circles.

Figure 1 Figure 2 Figure 3

(a) Draw Figure 4.

Answer

[1]

(b) **Intersect** represents the number of points of intersections between the circles in Figure n. Complete the table.

Answer

n	1	2	3	4	5
Intersect	0	2	4		

[1]

(c) Write down an expression for the nth term of this sequence.

Answer _____ [1]

(d) Which figure has 34 intersections? Show your working clearly.

Answer Figure _____ [2]

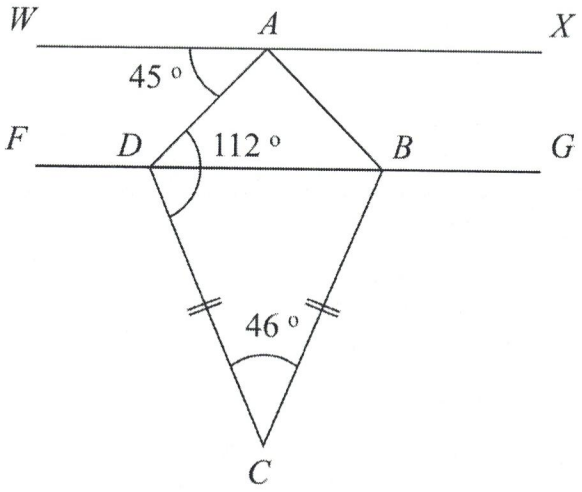
3 **(a)** **(i)** Construct triangle ABC where angle $ABC = 100°$ and angle $CAB = 45°$.
AB has already been drawn.

[2]

(ii) Measure AC.

Answer $AC =$ _____ cm [1]

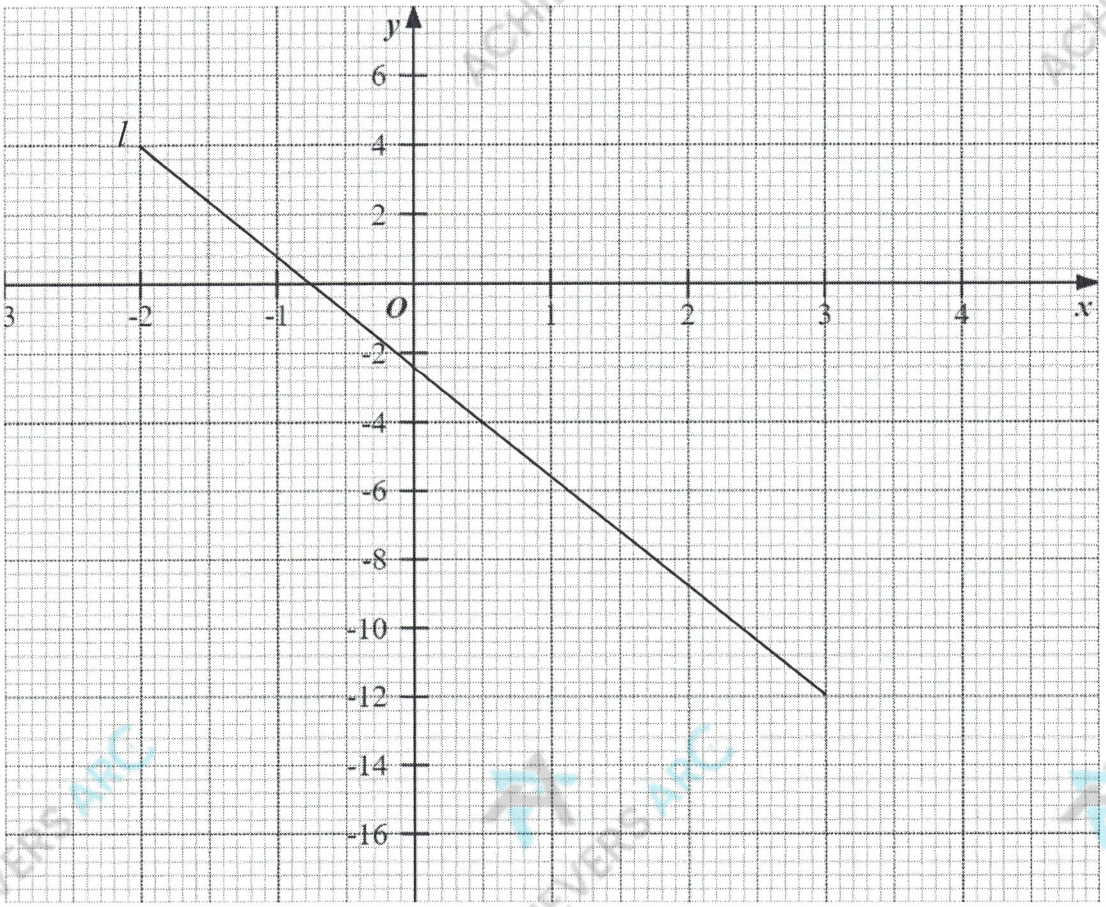
(b) In the diagram, $CD = CB$.
Angle $WAD = 45°$, angle $ADC = 112°$ and angle $BCD = 46°$.
Show your working and explain why WX is parallel to FG.



Answer

[3]

4 The line l is drawn on the grid below.



(a) **(i)** Complete the table of values for $y = 3x - 8$.

x	–2	1	2	4
y	–14	– 5		4

[1]

(ii) On the grid, draw the graph of $y = 3x - 8$ for $-2 \le x \le 4$. [2]

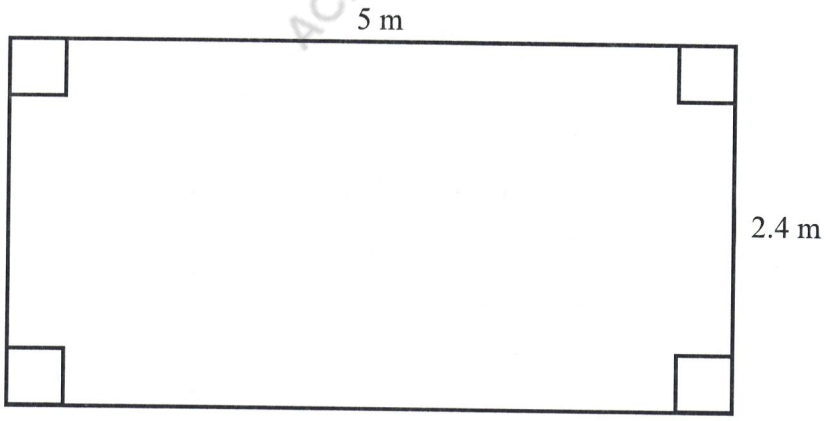
(iii) Write down the coordinates of the point where the line $y = 3x - 8$ cuts the y-axis.

Answer (_____, _____) [1]

(b) Find the gradient of line l.

Answer _____ [1]

5 The diagram shows the plan of a floor.
The dimensions of the floor are 5 m by 2.4 m.



The floor is to be tiled using identical square tiles.

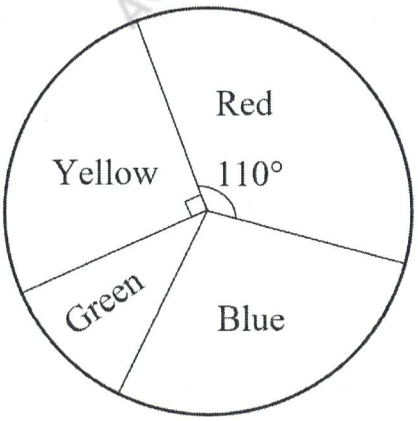
(a) Find the largest possible length, in cm, of the side of each tile.

Answer _____ cm [2]

(b) Find the number of tiles required to fully lay the floor.

Answer _____ [2]

6 Some students were asked which colour they liked best.
The results are shown in the pie chart.



(a) Three times as many students said Blue than Green.
Calculate the angle of the sector which represents the number of students who said Green.

Answer _____ ° [2]

(b) Eight more students said Red than Yellow.
Calculate the number of students who said Red.

Answer _____ [2]

7 Daniel went on a cycling journey.
In the first part of his journey, he cycled at an average speed of y km/h for 3 hours.
He then reduced his average speed by 4 km/h and completed the second part of his journey in 45 minutes.

(a) Write down an expression, in terms of y, for the distance covered in the first part of Daniel's journey.

Answer _____ km [1]

(b) Daniel's average speed for the whole journey was 16 km/h.
Form an equation in y and find his average speed in the first part of his journey.

Answer _____ km/h [3]

8 Solve the following equations.

(a) $45 = -5(2x + 3)$

Answer $x =$ _____ [2]

(b) $\dfrac{2}{1-6p} = \dfrac{4}{p}$

Answer $p =$ _____ [3]

9 Jie was at the supermarket with a 50-dollar note to shop for his groceries.

The list shows the prices of the items.

Price List

1. 1 bottle of orange juice for $\$p$
2. 1 dozen of eggs for $\$q$
3. 1 loaf of bread for $\$0.6p$

He bought 3 bottles of orange juice, 6 eggs and 2 loaves of bread.

(a) Write down, in its simplest form, an expression for the amount he had to pay for the eggs in terms of q.

Answer \$ _____ [1]

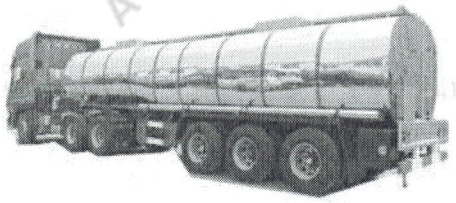
(b) Find, in its simplest form, an expression for the total amount he had to pay for all the groceries in terms of p and q.

Answer \$ _____ [1]

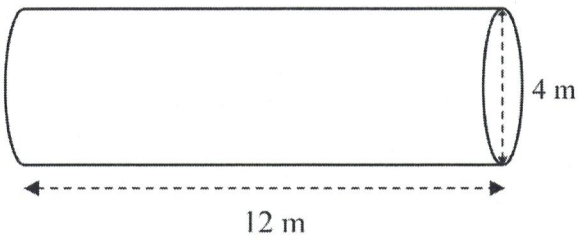
(c) If $p = 2.5$ and $q = 3.2$, find the change he would receive after paying for all the groceries.

Answer \$ _____ [2]

10 The picture shows a tank trailer driven on the road to transport different kinds of fuel such as crude oil.



The tank on the trailer is modelled as a cylinder with length 12 m and diameter 4 m.



(a) For safety reasons, the tank can only be filled to a maximum of 80% of its capacity. Find the volume of fuel the tank should hold due to safety reasons. Give your answer correct to 2 decimal places.

Answer _____ m^3 [3]

(b) The exterior of the tank is to be painted.
The table shows the price comparison between Company A and Company B.

Company A	
$< 50\ m^2$	\$1400
$51 - 100\ m^2$	\$2660
$101 - 150\ m^2$	\$3990
$151 - 200\ m^2$	\$5320

Company B
\$30 per m^2

Which company would you hire to paint the exterior of the tank?
Show your working clearly and explain your answer.

Answer Company _____ because _____ [5]

_____

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