Name:_____ Index Number: _____ Class: _____

TEMASEK SECONDARY SCHOOL
Final Term Examination 2023
Secondary One Express

MATHEMATICS

Paper 2 **1 hour 15 minutes**

Question and Answer Booklet

READ THESE INSTRUCTIONS FIRST

Do not open the booklet until you are told to do so.

You are <u>required</u> to submit this booklet at the end of the paper.

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 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 a 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.

At the end of the examination, fasten all your work securely together.
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 **50**.

For Examiner's Use
50

Calculator model:

Mathematical Formulae

Compound Interest

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

Mensuration

Curved surface area of a cone = πrl

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

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

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

Answer **all** the questions.

1 The area of Singapore is 728 600 000 m^2. This number has been rounded to 4 significant figures. What is the largest and the smallest possible integer value of the area of Singapore?

Answer Largest = …… m^2 [1]

Smallest = …… m^2 [1]

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2 Factorise each of the expressions completely.

(a) $30abc + 3ab - 18bc$,

Answer …… [1]

(b) $4y + 3(2z - 6)$.

Answer …… [2]

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3 Gretchen and her friends ate at a restaurant. The marked price of the food they ordered is $268.35. With a membership card, they were then given a 5% discount.

Given that there is a service charge of 10% and GST is at 8%, calculate the total amount paid by Gretchen and her friends.

Answer $…… [3]

4 The numbers 2156 and 2800, written as the product of their prime factors, are

$$2156 = 2^2 \times 7^2 \times 11,$$
$$2800 = 2^4 \times 5^2 \times 7.$$

(a) Find the highest common factor of 2156 and 2800.

Answer …… [1]

(b) Find the smallest positive integer k such that $2156k$ is a perfect square.

Answer …… [1]

(c) Find the smallest positive integer q such that $2156q$ is a multiple of 2800.

Answer …… [2]

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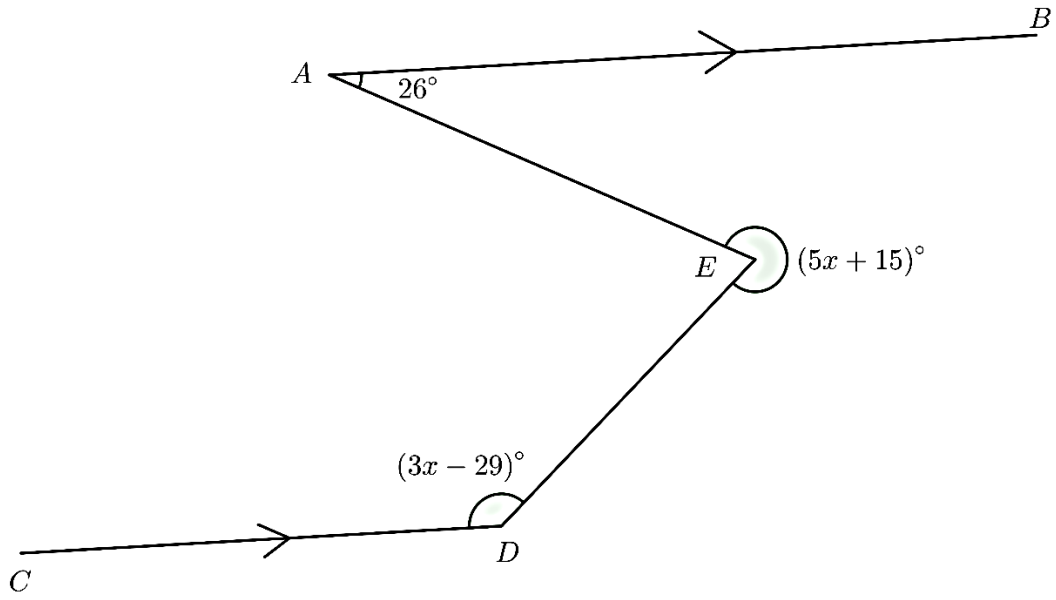
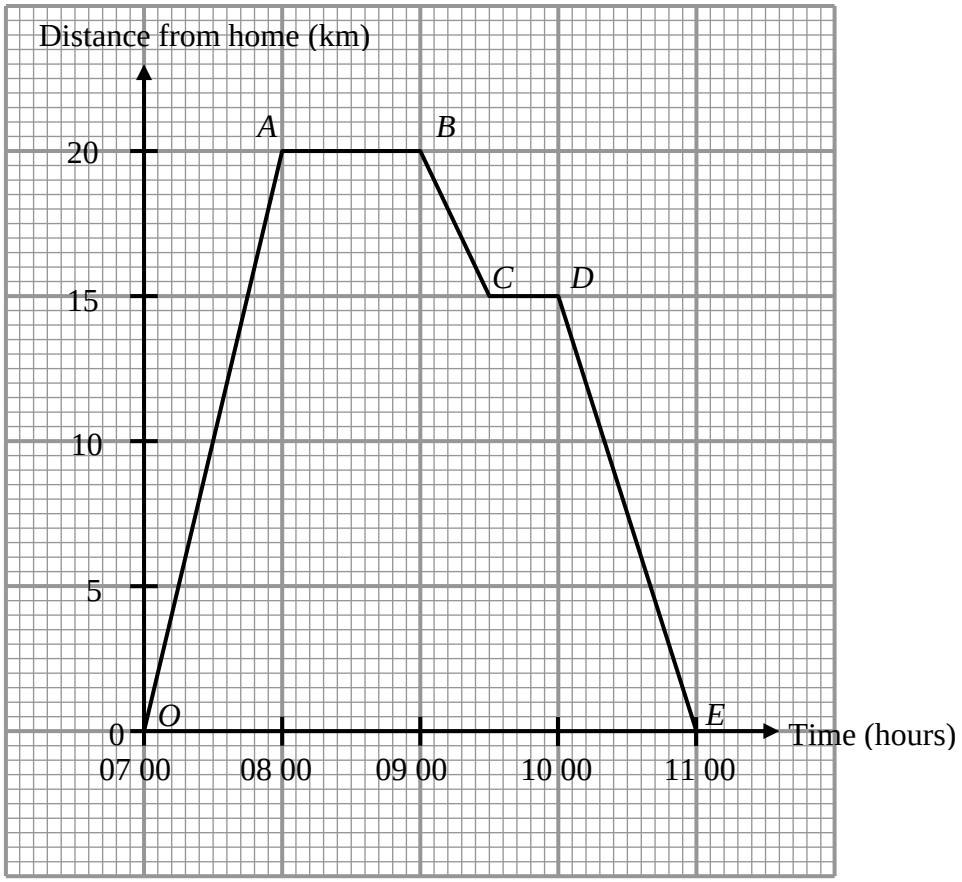
5 In the diagram below, *AB* is parallel to *CD*, $\angle BAE = 26^\circ$, $\angle CDE = (3x - 29)^\circ$ and reflex $\angle DEA = (5x + 15)^\circ$.



Find the value of *x*. Show your working clearly with the reasons stated.

Answer x = …… [4]

6 Daniel cycled from home to a supermarket. On his way home, he stopped by a food centre to have his breakfast. The distance – time graph for his entire journey is shown below.



(a) What is the distance between the supermarket and food centre?

Answer …… km [1]

(b) Find the total time Daniel stayed at the supermarket and the food centre.

Answer …… h [1]

(c) Find the gradient of the line segment *OA*, stating clearly what the gradient represents.

Answer Gradient = ……The gradient represents……

……[2]

7 Simplify

(a) $3a \times 4b - 2c$,

Answer …… [1]

(b) $p - 3(q - 2p)$,

Answer …… [2]

(c) $\frac{5x-1}{6} + \frac{7(x+3)}{8}$.

Answer …… [3]

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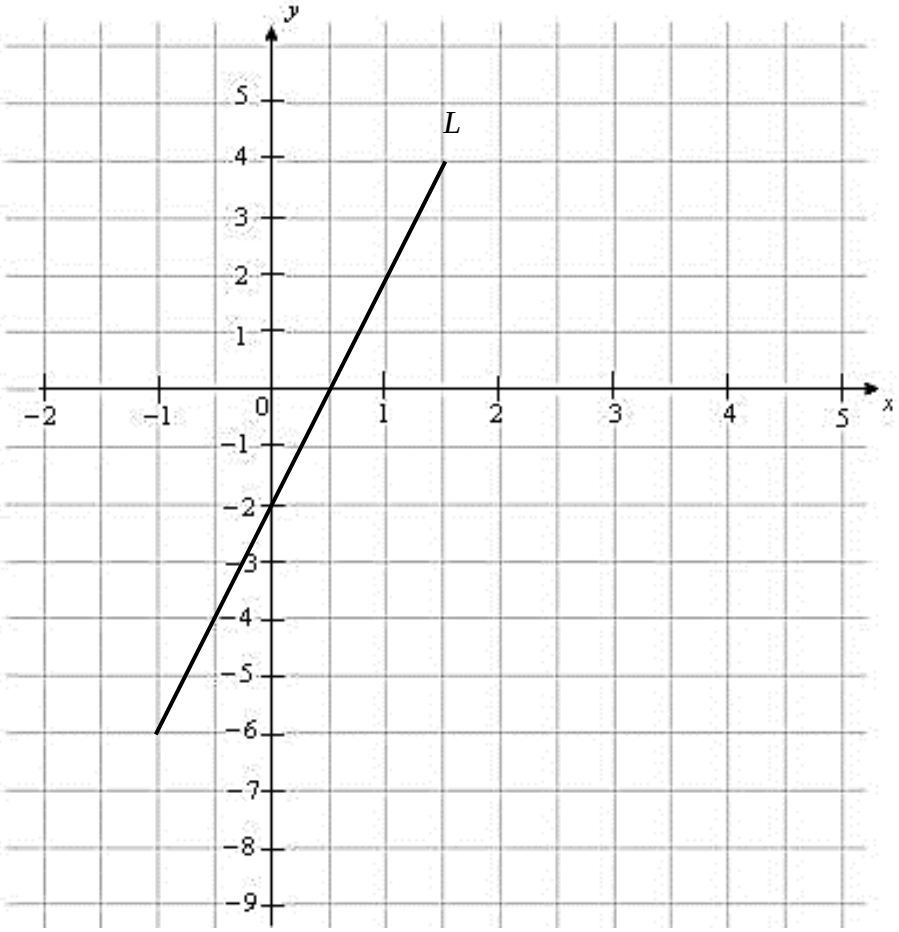
8 In the grid provided, line L has been drawn.



(a) The equation of line L is given as $y = 4x + p$. State the value of p.

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

The given table of values for another linear graph, $y = -2x + 1$.

x	-2	1	q
y	5	-1	-3

(b) Calculate the value of q.

Answer $q =$ ..... [1]

(c) By plotting all the points in table, draw the graph of $y = -2x + 1$ in the grid provided in the previous page.

[1]

(d) Using your graph of $y = -2x + 1$, find the value of x when $y = 2$.

Answer ..... [1]

(e) The point R lies on both $y = -2x + 1$ and line L. Label point R on the graph and write down the coordinates of the point R.

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

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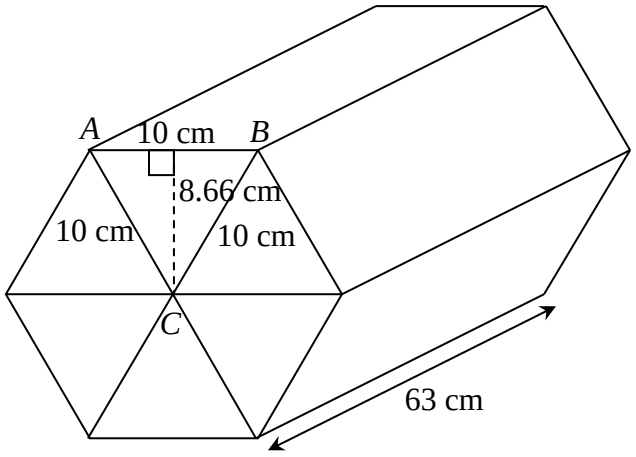
9 The diagram shows a solid hexagonal prism. The cross-section of the prism is a regular hexagon made up of six equilateral triangles.
Each equilateral triangle has length 10 cm and its perpendicular height is 8.66 cm.
The length of the prism is 63 cm.



Calculate

(a) the area of triangle *ABC*,

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

(b) the volume of the prism,

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

(c) the total surface area of the prism.

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

(d) the cost of wrapping the hexagonal prism if 500 cm^2 of wrapping paper cost \$1.12.

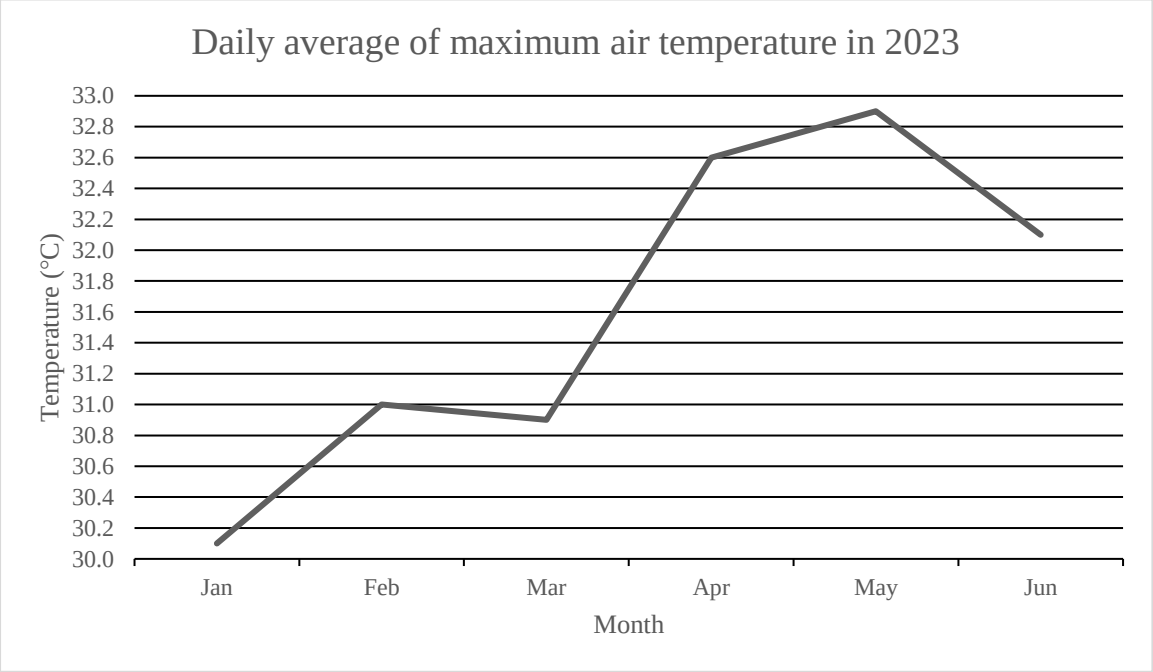
Answer \$…… [2]

(e) Elias melts a hexagonal prism and reshapes it to create cylinders of radius 8 cm and height 4.5 cm. Determine if he will be able to create 20 such cylinders.

Answer Elias **will be able** / **will not be able** (circle your answer) to have 20 such cylinders because ……

……[3]

10 The line graph below shows the daily average of the maximum air temperature from January 2023 to June 2023.



(Modified from source: https://tablebuilder.singstat.gov.sg/table/TS/M890081)

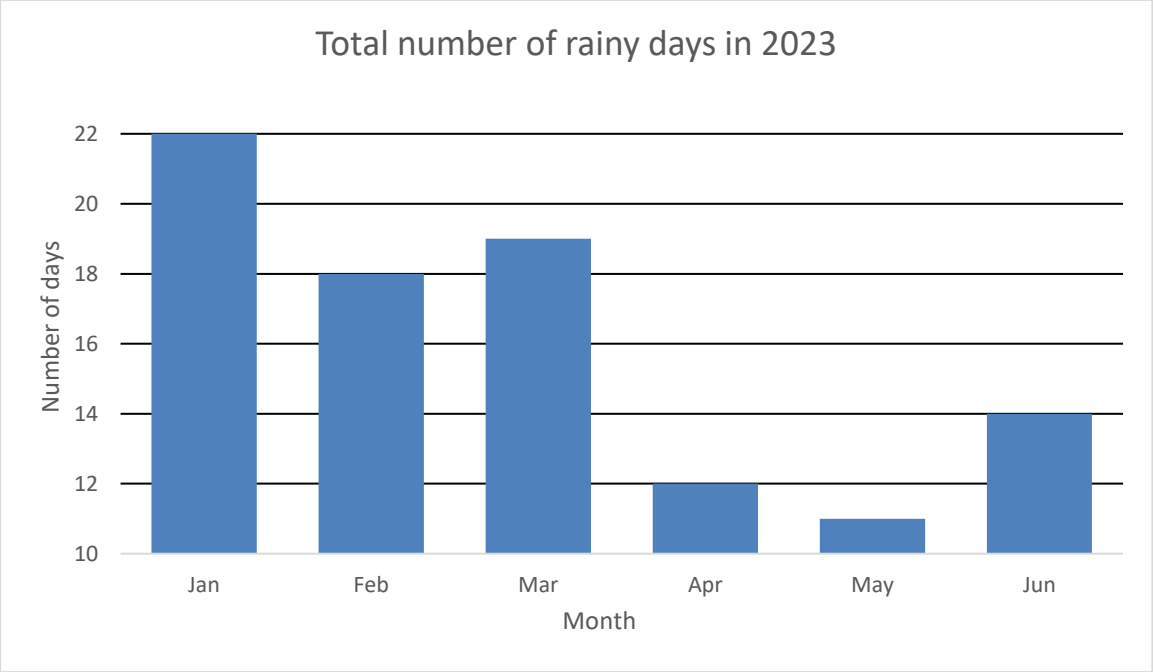
(a) Between which two months did the temperature have the greatest increase?

Answer …… and…… [1]

(b) Find the temperature difference between January 2023 and February 2023.

Answer ……°C [1]

The graph below shows the number of rainy days from January 2023 to June 2023.



(Modified from source: https://tablebuilder.singstat.gov.sg/table/TS/M890081)

(c) How many rainy days are there in June 2023?

Answer …… [1]

(d) Given that there is a total of 181 days from January 2023 to June 2023, what percentage of the total days were rainy?

Answer ……% [1]

(e) Kaylee claims that the number of rainy days in January 2023 is six times more than the number of rainy days in April 2023 based on the height of the bar graphs.

Do you agree with her statement? If not, state one feature of the graph that may lead to this misinterpretation.

Answer I **agree** / **disagree** (circle your answer) with Kaylee because …….

……..……

……..…….[2]

[Turn over

(f) Shawn claims that the higher the number of rainy days, the lower the daily average of maximum air temperature for that particular month.

Do you agree with his statement? Justify your answer by comparing both statistical diagrams given on page 14 and 15 and provide specific examples.

Answer I **agree** / **disagree** (circle your answer) with Shawn as comparing the two statistical diagrams, I observed that ……..……

……..……..……

……..……

……..……..…[2]

End of Paper