FINAL EXAMINATION
2022 - 2023
S.1 MATHEMATICS
PAPER 1

UCCKE F1 2022-23 Final Maths I

Final Examination 2022 - 2023

S.1 Mathematics

Paper 1

Question-Answer Book

27th June, 2023

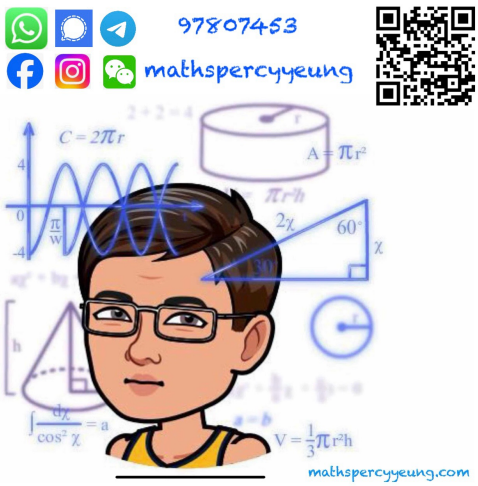
This paper must be answered in English.

Time allowed: 60 minutes

- This paper consists of THREE sections:
  - Section A: Basic Questions (21 marks)
  - Section B: Intermediate Questions (18 marks)
  - Section C: Advanced Questions (11 marks)
- Attempt ALL questions, using this Question-Answer Book.
- Unless otherwise specified, all working must be clearly shown.
- Unless otherwise specified, numerical answers should be either exact or correct to 3 significant figures.
- The diagrams in this paper are not necessarily drawn to scale.
- Only the calculator with the label 'H.K.E.A.A. Approved' can be used in this examination.

Name: _____

Class: _____( )



Section	Marks
Section A:	/ 21
Section B:	/ 18
Section C:	/ 11
Paper 1 Total (65%) :	/ 50
Combining Papers 1 (65%) and 2 (35%)	
Grand Total:	/ 100

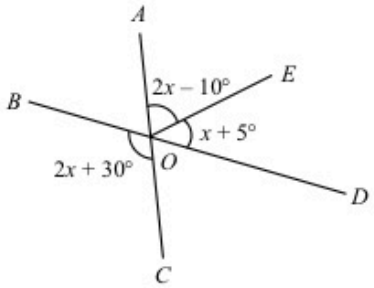
Section A: Basic Questions (21 marks)

1. Express $\frac{23}{7}$ in decimal correct to
   (a) 3 significant figures,
   (b) 4 decimal places. (2 marks)

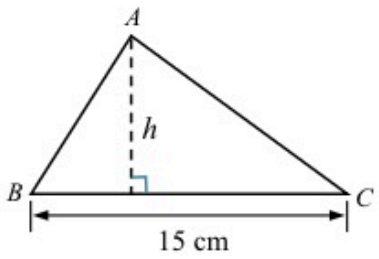
2. Expand $(h - 1)(h + 5)$. (2 marks)

3. The volume of a canned drink is reduced by 35 mL. If the percentage decrease is 10%, find
   (a) the original volume of the canned drink, (2 marks)
   (b) the new volume of the canned drink. (1 mark)

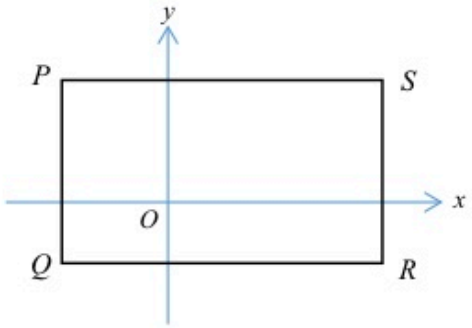
4. In the figure, AC and BD intersect at point O. Find $\angle EOD$. (3 marks)



5. The figure shows a triangle ABC which has the same area as a square of side 9 cm. Find h. (2 marks)



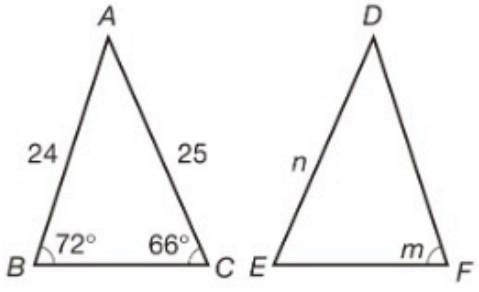
6. The figure shows a rectangle $PQRS$. The coordinates of P and Q are $(-2, 3)$ and $(-2, -1)$ respectively. It is given that $PS = 7$ units.



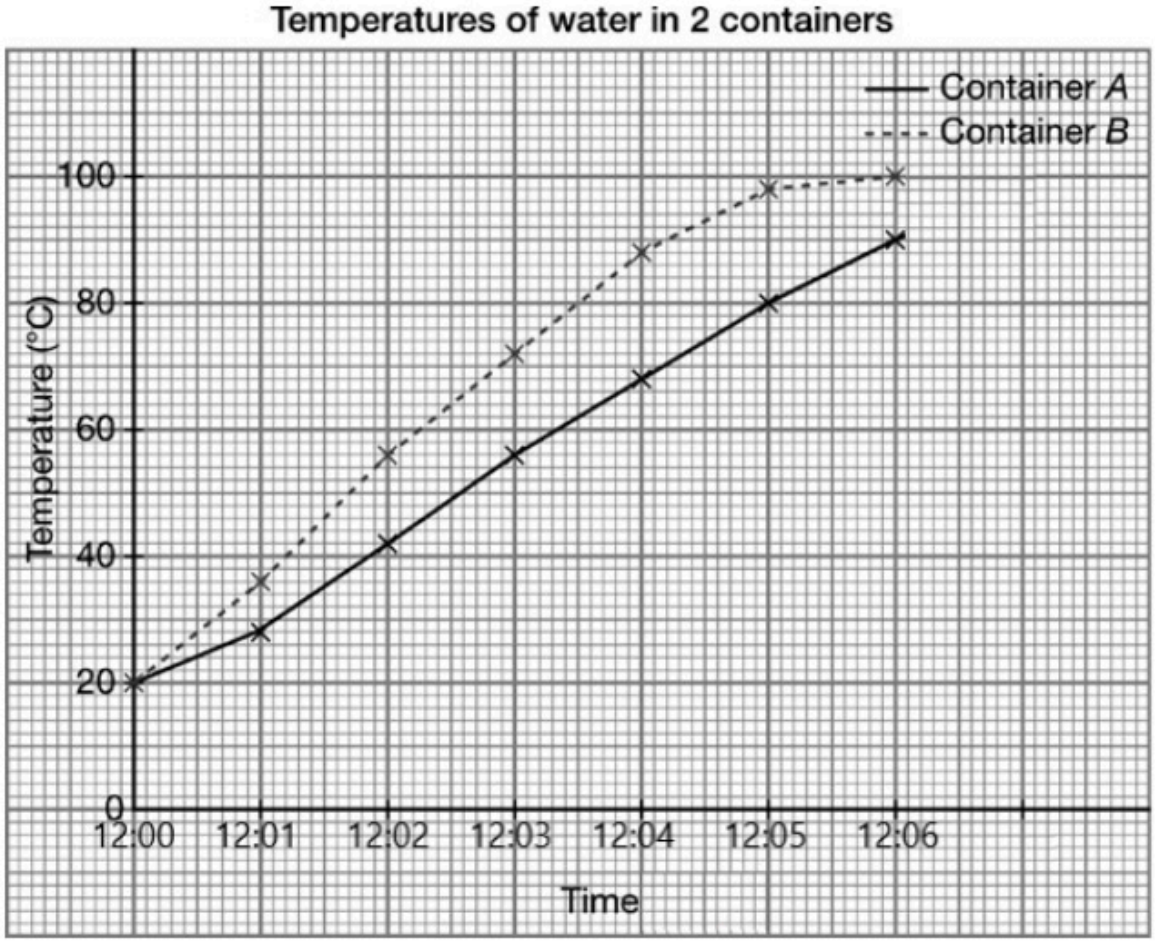
(a) Write down the coordinates of S and R. (1 mark)

(b) Find the perimeter of $PQRS$. (2 marks)

7. In the figure, $\triangle ABC \cong \triangle DFE$. Find m and n. (3 marks)



8. The following broken line graph shows the temperatures (in °C) of water in 2 containers during heating.



(a) Write down the difference in the temperatures of water in the containers at 12:05. (1 mark)

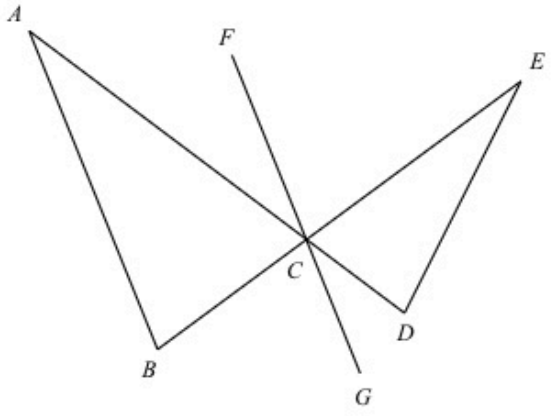
(b) During which 1-minute interval, was the increase in temperature of water in container *B* the smallest? What was the increase? (2 marks)

~ End of Section A ~

Section B: Intermediate Questions (18 marks)

9. Solve the equation $\frac{3x+1}{4} - \frac{2x-1}{6} = 0$. (4 marks)

10. In the figure, AD and BE intersect at point C. FCG is a straight line. It is given that $\angle CED = 22°$, $\angle CDE = 74°$, $\angle BAC = 34°$ and $\angle BCG = 62°$. Prove that $AB \parallel FG$. (3 marks)



11. Figure I shows a right triangular prism.

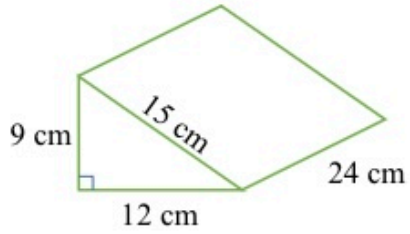


Figure I

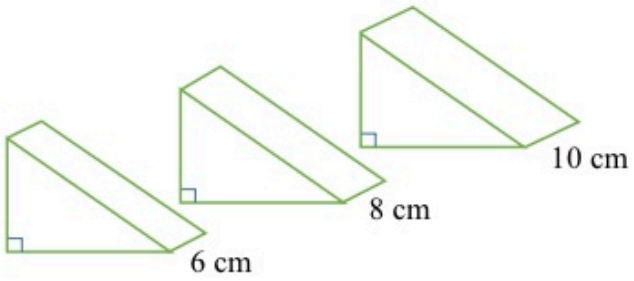


Figure II

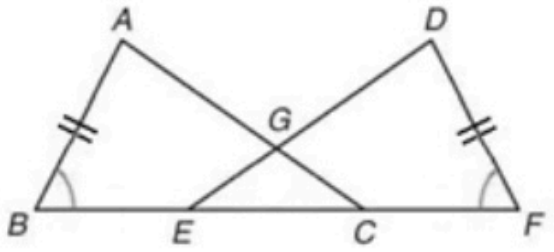
(a) Find the total surface area of the prism in Figure I. (3 marks)

(b) The prism is to be painted and the painting cost of each cm^2 is $\$a$. If the triangular prism in Figure I is cut into three triangular prisms with heights 6 cm, 8 cm and 10 cm respectively as shown in Figure II, the change in the painting cost is +\$32.4. Find the value of a. (2 marks)

12. In the figure, $BECF$ is a straight line. $BE = CF$, $AB = DF$ and $\angle ABC = \angle DFE$.

(a) Write down a pair of congruent triangles and give reason. (1 mark)

(b) If $\angle ACB = 35°$, find $\angle EGC$. (2 marks)



13. The following data show the temperatures (in °C) of two cities in the past two weeks.

City *A*					City *B*				
22	30	24	17	25	29	19	18	26	23
26	25	16	23	18	21	19	23	27	19

Construct a back-to-back stem-and-leaf diagram below to present the data. (3 marks)

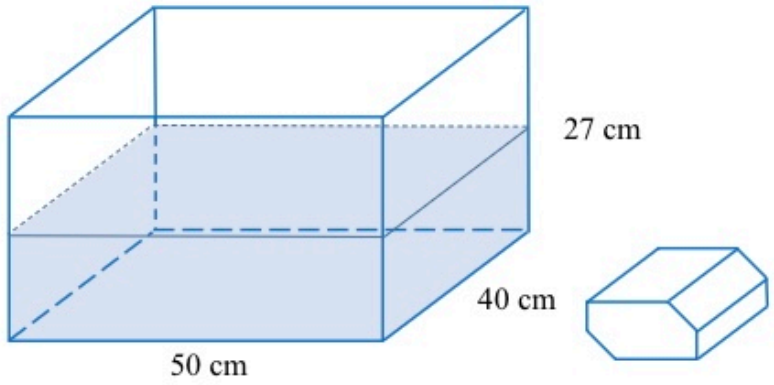
Temperatures of two cities in the past two weeks

City *A*		City *B*

~ End of Section B ~

Section C: Advanced Questions (11 marks)

14. The figure shows a rectangular water tank of length 50 cm, width 40 cm and height 27 cm, and a prism of height 16 cm. The tank is half-filled with water. It is given that when the prism is put into the tank, it is totally immersed in water and the water level rises 2 cm.

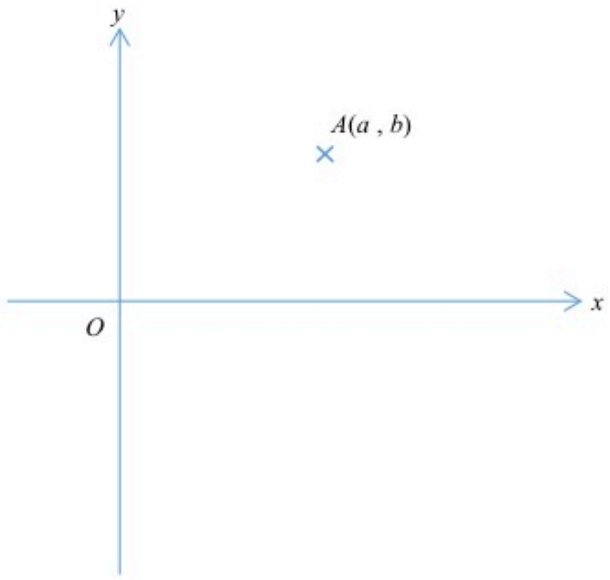


(a) Find the base area of the prism. (2 marks)

(b) Grace claims that when the prism is put vertically into the tank with the base facing upwards, it will be totally immersed in water. Do you agree? Explain your answer by considering the volume of water.

(3 marks)

15. In the figure, the coordinates of the point A are (a, b), where $a > b > 0$. Denote the origin by O. A is translated downwards by 14 units and then translated horizontally to C. And then C is rotated anti-clockwise about O through 90° to a point D. It is given that the coordinates of A and D are the same.



(a) (i) Write down the coordinates of C in terms of a and b.

(ii) Express a in terms of b. (2 marks)

(b) B is a point in quadrant IV such that $OABC$ is a square. It is given that AB cuts the x-axis at P. BC is produced to meet the y-axis at Q. Prove that $\triangle OAP \cong \triangle OCQ$.

(2 marks)

(c) If $OP = 12.5$ units and the area of $OPBC$ is 62.5 square units which is $45\frac{5}{11}\%$ of the area of $OABQ$, find the coordinates of A. (2 marks)