



華僑中學

**Hwa Chong Institution
Secondary 1 PAPER H**

CANDIDATE
NAME

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CLASS

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REGISTER
NUMBER

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Mathematics

2 hours

Additional materials:

Writing papers and Blank paper

READ THESE INSTRUCTIONS FIRST

Write your name, class and register number on all the work that you hand in.

Write in dark blue or black pen.

You may use an HB pencil for any diagrams or graphs.

Answer **all** questions.

Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place in the case of angles in degrees, unless a different level of accuracy is specified in the question.

The use of an approved scientific calculator is expected, where appropriate.

For π , use either your calculator value or 3.142, unless the question requires the answer in terms of π .

You are reminded of the need for clear presentation in your answers.

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 of the marks for this paper is **72**.

This document consists of **6** printed pages.

- 1** Simplify
- (a) $3x - 2y + 2(2x - 3y)$, [2]
- (b) $\left(\frac{c}{6} - \frac{5d}{6}\right) \div (5d - c)$. [3]
- 2** Factorise $15ab^2 - 9a^2b$ completely. [1]
- 3** Solve the equations.
- (a) $4x = \frac{16}{x}$ [2]
- (b) $\frac{4m+5}{2m-1} = \frac{3}{2}$ [3]
- 4** Given $\sqrt{b+c} = 2a$,
- (i) make b the subject of the formula, [2]
- (ii) hence find the value of b , given that $a = 2$ and $c = -1$. [2]
- 5** In a trapezium, the length of the parallel sides are $(4y-11)$ cm and $(2y-1)$ cm.
The distance between the two parallel sides is 10 cm.
- (i) Given that the area of the trapezium is 210 cm^2 , show that $210 = 5(6y-12)$. [2]
- (ii) Hence, find the value of y . [2]
- 6** A map uses 4 cm^2 to represent an actual area of 25 m^2 . Calculate
- (i) the actual area of an estate, in m^2 , which is 250 cm^2 on the map. [2]
- (ii) the length on the map, in cm, representing a distance between two locations which are 0.08 km apart on actual ground. [2]
- 7** (i) Solve the inequality $3x - 5 \geq \frac{7x+3}{5}$. [3]
- (ii) Hence, write down the smallest integer satisfying the inequality $3x - 5 \geq \frac{7x+3}{5}$. [1]

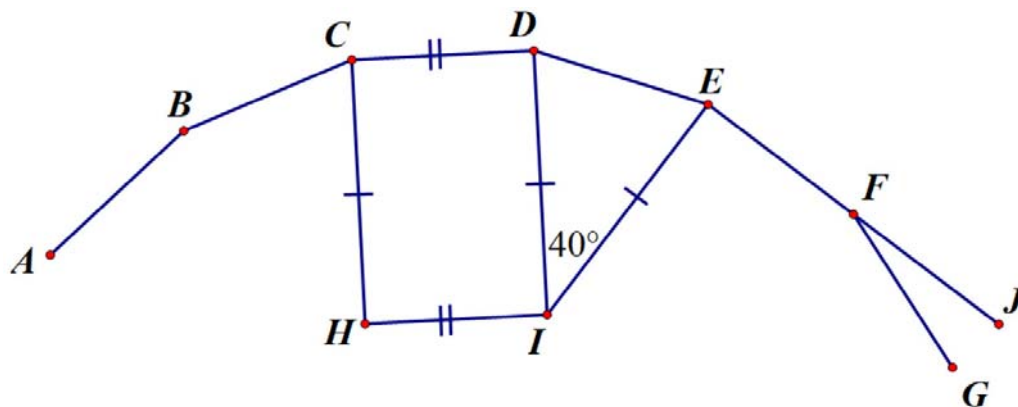
- 8 In class 1Q1, 40% of the students scored A1 for a Mathematics test.
- (i) If 14 students in class 1Q1 scored A1 for the test, find the number of students in class 1Q1. [2]
- (ii) 60% of the students in another class 1R1 scored A1 for the same Mathematics test. Is it true that the overall percentage of A1 score of the two classes must be 50%? Explain your answer. [2]

- 9 Study the following number pattern.

$$\begin{aligned}\frac{8}{2 \times 4 \times 6} &= \frac{1}{2} - \frac{2}{4} + \frac{1}{6} \\ \frac{8}{4 \times 6 \times 8} &= \frac{1}{4} - \frac{2}{6} + \frac{1}{8} \\ \frac{8}{6 \times 8 \times 10} &= \frac{1}{6} - \frac{2}{8} + \frac{1}{10} \\ &\vdots\end{aligned}$$

- (i) Write down the 4th line of the pattern. [1]
- (ii) Write down the n^{th} line of the pattern. [2]
- (iii) Find the values of a and b , such that $\frac{1}{5 \times 42 \times 44} = \frac{1}{a} - \frac{2}{b} + \frac{1}{44}$. [2]

- 10 In the diagram below, $ABCDEFG$ is a part of a regular polygon with n sides. $CDIH$ is a rectangle, $DI = EI$, $\angle EID = 40^\circ$. Points E , F and J are on the same straight line.

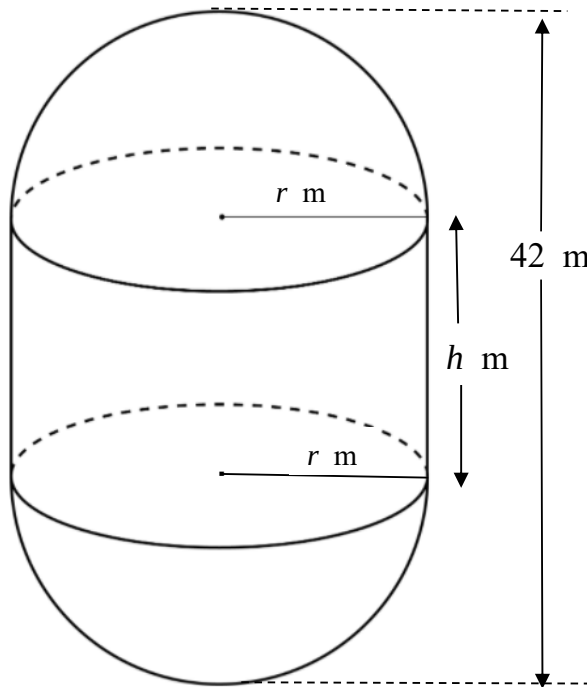


Find

- (i) $\angle CDE$, [2]
- (ii) $\angle GFJ$, [2]
- (iii) the value of n . [2]

- 11 Without using a calculator, estimate the value of $\frac{\sqrt{3.96 + 2.993 \times 4.049}}{(20.45)^2 - \sqrt[3]{26.735} \times (9.96)^2}$ to 1 significant figure, showing your working clearly. [2]

- 12 Singapore planned to build a second bubble facility for non-quarantined business travelers near Marina Bay Sands. The facility, called Connect@MBS will be built in the shape of a capsule with a hemispherical roof on top and a hemispherical basement as shown in the diagram below. The height of the capsule is 42 m and its radius is r m. The height of the cylindrical part of the capsule is h m.



- (i) The surface area of the hemispherical roof is 450π m². Show that the radius, r , of the capsule is 15 m. [2]
- (ii) Calculate the value of h . [2]
- (iii) Calculate the volume of the capsule. (Take $\pi = 3.142$) [3]

[Surface area of sphere = $4\pi r^2$, Volume of sphere = $\frac{4}{3}\pi r^3$, Volume of cylinder = $\pi r^2 h$]

- 13** The mean and median of the marks obtained in a third language Korean Test for 3 classes of students, K1A, K1B and K1C, are given in the table.

Class	K1A	K1B	K1C
Mean	58	60	54
Median	52	51	53
Number of students		35	y

- (i) The ratio of the number of students in class K1A to that of class K1C is 2 : 3 .
If the number of students in class K1C is y , find the number of students in class K1A in terms of y . [1]
- (ii) Given that there are 110 students in the 3 classes, find the number of students in class K1A. [3]
- (iii) If the number of students are to be represented on a pie chart, determine the angle of sector of class K1A on the pie chart, giving your answer correct to the nearest 1 decimal place. [2]
- (iv) The mean and median in class K1B differ quite significantly. Give a possible explanation for this. [1]
- (v) Which class performed the best in the test? Explain why. [2]

- 14 Singapore's co-developed vaccines for flu virus were well received. The vaccines are sold in boxes of different quantities. The following table shows the distribution of the first batch of orders of the vaccines, where a is an integer.

Number of vaccines per box	10	20	30	40	50
Number of orders	15	45	35	a	37

- (i) If the modal number of vaccines ordered per box is 20, find the greatest possible value of a . [1]
- (ii) If the median number of vaccines ordered per box is 30, find the greatest possible value of a , showing your working clearly. [2]
- (iii) If the mean number of vaccines ordered per box is 31.25, find the value of a . [2]

- 15 **ANSWER THE WHOLE OF THIS QUESTION ON THE GIVEN SHEET OF BLANK PAPER.**

Construct a quadrilateral $ABCD$ in which $AB = 5$ cm, $\angle BAD = 80^\circ$, $AD = 8.4$ cm, $BC = 11.5$ cm, $CD = 6$ cm. [3]

- (i) Measure and write down the length of BD . [1]
- (ii) Construct the perpendicular bisector of BD . [1]
- (iii) Construct the angle bisector of $\angle BCD$. [1]
- (iv) Mark the point where the lines drawn in (ii) and (iii) intersect as point E . [1]

End of Paper