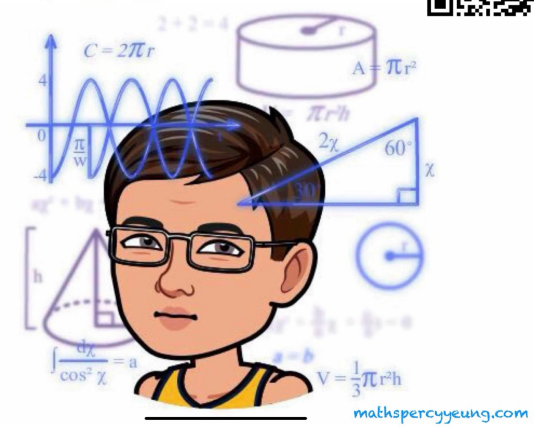
# HTY S1 Final 2023-2024






**Time Allowed: 1 hour 45 Minutes**

This paper must be answered in English.

## INSTRUCTIONS

1. Write your name, class and class number in the spaces provided on this cover.
2. This paper consists of TWO parts.

   Part I consists of THREE sections, A1, A2 and B.

   Part II consists of 13 multiple-choice questions. All questions carry equal marks.
3. Attempt **ALL** questions in the paper. Write your answers in the spaces provided in this Question-Answer Book.
4. Unless otherwise specified, **all working** must be **clearly** shown.
5. Answers of multiple choice questions should be **marked with an HB pencil on the multiple choice answer sheet** provided.
6. **Unless otherwise specified, numerical answers should be exact or correct the answer to 3 sig. fig.**
7. The diagrams in this paper are not necessarily drawn to scale.

| | | |
|---|---|---|
| **Part I** | **Section A1 (25)** | |
| | **Section A2 (26)** | |
| | **Section B (25)** | |
| **Part II** | **MC (24)** | |
| | **Mark Deduction (-)** | |
| | **Total (100)** | |
| **Parent's Signature** | | |

**PART I (Short and Long Questions): (76 marks)**
**Answer ALL questions and write your answers in the spaces provided. Give reasons if necessary.**

**SECTION A(1) (25 marks)**

**1.** **(a)** Round **up** 160 249 to the nearest hundred. (1 mark)

**(b)** Round **down** 5.2056 to 2 decimal places. (1 mark)

**(c)** Round **off** 103.0752 to the 4 significant figures. (1 mark)

**2.** Simplify $\left(3xy^4\right)^2 \div \frac{y^3}{\left(x^3\right)^4}$. (4 marks)

**3.** (a) Expand $(x + 5)(3x – 1)$. (2 marks)

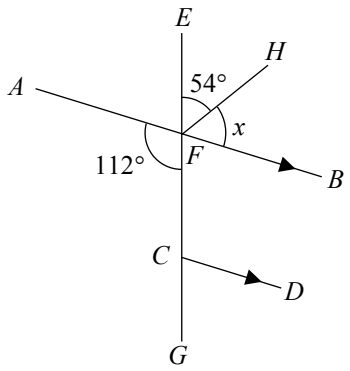
(b) Use the result of (a), expand $(x + 5)(3x – 1) – (5x^2 – 2x + 4)$. (3 marks)

4. The marked price of a carpet is \$1 400, and it is sold at a discount of 10%.

(a) Find the selling price of the carpet. (2 marks)

(b) A profit of \$360 is made by selling the carpet. Someone claims that the profit per cent is less than 30%. Do you agree? Explain your answer. (4 marks)

**5.** In the figure, *AFB* and *EFCG* are straight lines, and *AB* // *CD*.




(a) Find the value of $x$.

(b) Find $\angle DCG$.

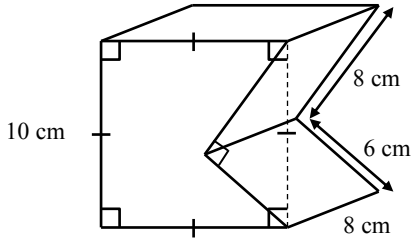
(7 marks)

**SECTION A(2) (26 marks)**

**6.** The figure shows a metal right prism A.

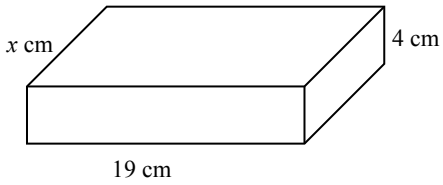
(a) (i) Find the volume of prism A. (3 marks)

(ii) Find the total surface area of prism A. (3 marks)




Prism A

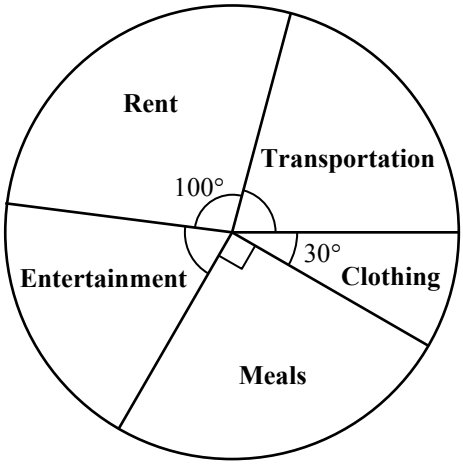
(b) The prism A is then melted and recast into a rectangular prism B. Find the value of $x$.




Prism B (2 marks)

**7.** The pie chart below shows the expenditures of Ms. Chan in May. It is given that she spent \$1 500 on clothing in that month.

**Expenditures of Ms. Chan in May**



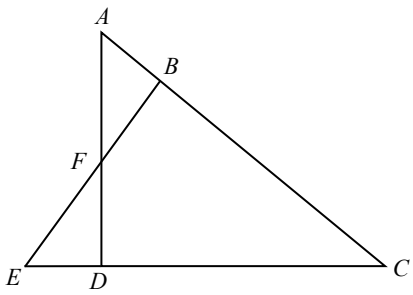

(a) Find

(i) her total expenditure in May, (2 marks)

(ii) her expenditure on transportation and entertainment in total in May. (2 marks)

(b) It is given that the expenditure on rent will increase by 40% in June, Find the expenditure on rent in June. (3 marks)

**8.** In the figure, $B$ and $D$ are points lying on $AC$ and $EC$ respectively such that $AD = EB$, $EB \perp AC$ and $AD \perp EC$. $BE$ and $DA$ intersect at point $F$.




(a) Prove $\triangle ACD \cong \triangle ECB$.

(b) If $\angle ACD = 28°$, find $\angle EFD$.

**9.** Originally, Tom has 18 game cards more than 3 times of Daisy's. Let $y$ be the number of Daisy's game cards.

(a) Express the number of Tom's game cards in terms of $y$. (1 mark)

(b) If Tom gives 20 game cards to Daisy, then the number of game cards owned by Tom is equal to that owned by Daisy. Hence, set the equation in $y$ and solve it. (2 marks)

(c) Does the total number of game cards are owned by Tom and Daisy more than 60? Explain your answer. (2 marks)

**SECTION B (25 marks)**

**10.** The back-to-back stem-and-leaf diagram below shows the heights of the members of two basketball teams.

**Heights of the members of two basketball teams**

| *Team A* | | | | | | *Team B* | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | *Leaf* (*1 cm*) | | ***Stem* (*10 cm*)** | *Leaf* (*1 cm*) | | | | |
| | | | | 7 | $x$ | **16** | 8 | | | | |
| 9 | 7 | 6 | 6 | 2 | | **17** | 5 | $x$ | 9 | | |
| $y$ | 8 | 4 | 2 | 0 | | **18** | 0 | 0 | 2 | 6 | 8 | 8 |
| | | | | | | **19** | 0 | 2 | | | |

(a) Write down all the possible values of $x$ and $y$. (2 marks)

(b) Find the least possible difference between the highest and the shortest members in Team A. (3 marks)

(c) Now, there are 3 more members who are above 180 cm height join Team A. Someone claim that there is more than 50% of the members are taller than 180 cm in Team A. Do you agree? Explain your answer. (2 marks)

**11.** The coordinates of point $A$ is (2, 5).

(a) Point $A$ is rotated anti-clockwise about the origin through 90° to point $B$. Find the coordinates of $B$. (1 mark)

(b) Point $A$ is translated downwards by 4 units and then is translated rightwards by 1unit to point $C$. Find the coordinates $C$. (1 mark)

(c) (i) Draw $\Delta ABC$ in Graph 1.

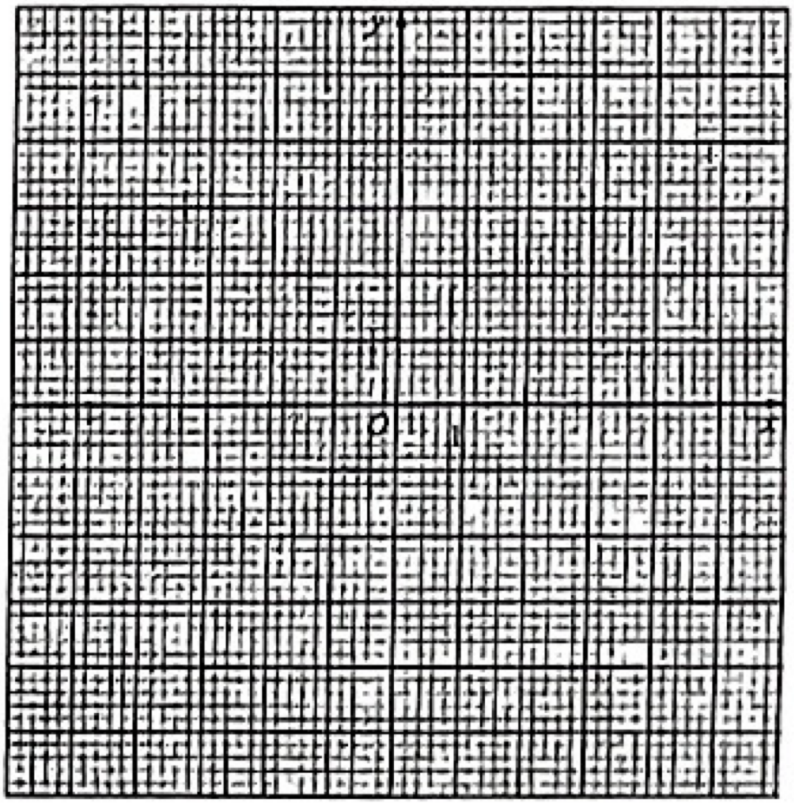
(ii) Find the area of $\Delta ABC$. (3 marks)

(d) $L$ is a line passing through the point (0, –1) and parallel to the $x$-axis.

(i) $B$ is reflected with respect to $L$ to point $D$. Find the coordinates of $D$.

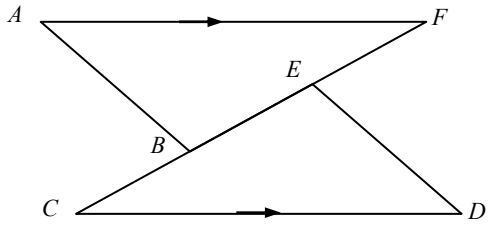
(ii) **Draw** $ABDC$ in Graph 1, and then **find** the area of $ABDC$.

(4 marks)



*Graph 1*

**12.** In the figure, $AF$ // $CD$, $CBEF$ is a straight line, $BC = EF$ and $AF = CD$.




(a) Prove that $\triangle ABF \cong \triangle DEC$. (4 marks)

(b) Hence, prove that $AB$ // $ED$. (2 marks)

(c) $AB$ is produced to $G$ which $G$ is a point on $CD$. $BF$ bisects $\angle AFG$. It is given that $\angle AFB = 18°$, $\angle CDE = 54°$. Is $AG \perp FG$? Explain your answer. (3 marks)

**End of Part I**

**PART II (Multiple Choice Section): (24 marks)**

**Please mark the answers in the correct box in Multiple Choice Answer Sheet with an HB pencil. The answers should be filled as ■ in the answer sheet.**

**1.** Find the H.C.F. and the L.C.M. of $2^3 \times 3 \times 5^4$ and $2^2 \times 3^4 \times 5^2$ .

| | H.C.F. | L.C.M. |
|---|---|---|
| A. | $2^2 \times 3^4 \times 5^2$ | $2^2 \times 3 \times 5^2$ |
| B. | $2^3 \times 3^4 \times 5^4$ | $2^2 \times 3 \times 5^2$ |
| C. | $2^2 \times 3 \times 5^2$ | $2^2 \times 3^4 \times 5^2$ |
| D. | $2^2 \times 3 \times 5^2$ | $2^3 \times 3^4 \times 5^4$ |

**2.** Which of the following gives the smallest value?

A. Subtract −3 from the sum of 9 and −1.

B. Add −7 to the difference of 5 minus 2.

C. Subtract −4 from the quotient of diving −18 by 6.

D. Add −10 to the product of −6 and 8.

**3.** In the figure, the 1st pattern is formed by 5 dots. For any positive integer $n$, the $(n + 1)$th pattern is formed by adding 3 dots to the $n$th pattern. Find the number of dots in the 5th pattern.

A. 11

B. 14

C. 17

D. 20

**4.** Solve the equation $50 - 2(5k + 4) = -4(3k - 7)$.

A. −14

B. −7

C. 7

D. 14

**5.** A number is rounded off to $N$ significant figures and the result is 0.020 50. Which of the following is correct?

A. 2

B. 3

C. 4

D. 6

**6.** For the polynomials $4x^4y + 5x^2y^5 - xy^3 - 7$,which of the following is/are correct?

I. The constant term is –7.

II. The terms of the polynomial are arranged in descending power of $x$.

III. The degree of polynomials is 5.

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

**7.** The number of members in a fans club has increased by 20% as compared to last year. If there are 1440 members this year, find the number of members last year.

A. 1 152

B. 1 200

C. 1 728

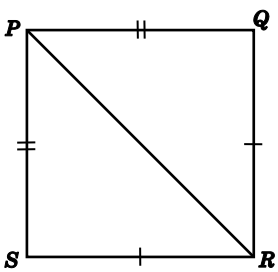
D. 1 800

**8.** Refer to the figure. Which of the following must be true?

I. $\triangle PSR \cong \triangle PQR$

II. $\angle SPQ = 90°$

III. $\angle PRS = \angle PRQ$




A. I and II only

B. I and III only

C. II and III only

D. I, II and III

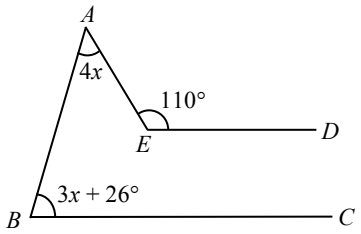
**9.** In the figure, $ED$ // $BC$ and $\angle AED = 110°$. Find reflex $\angle BAE$.

A. 12°

B. 48°

C. 312°

D. 348°



**10.** It is known that a horizontal line segment can be formed by joining $G(4w + 9 , w - 1)$ and $H(w - 2 , 2w + 1)$. Find the length of $GH$.

A. 5 units

B. 4 units

C. 3 units

D. 2 units

**11.** Suppose a point $P(3 , 7)$ undergoes each of the following transformations respectively. Which of the results have the same coordinates?

I. Reflect in the $y$-axis.

II. Translate 6 units to the left.

III. Rotate clockwise about the origin $O$ through 180°.

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

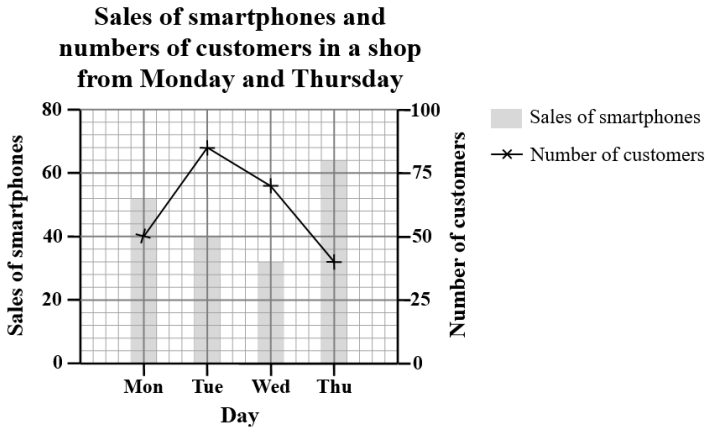
**12.** The statistical diagram below shows the sales of smartphones and the numbers of customers in a shop from Monday to Thursday. On which day was there 40 customers in the shop?

A. Monday

B. Tuesday

C. Wednesday

D. Thursday




**End of Part II**

**End of Paper**