

2024-2025 S3
1st TERM UT1
MATH

2024-2025
S3 First Term Uniform Test 1

MATHEMATICS

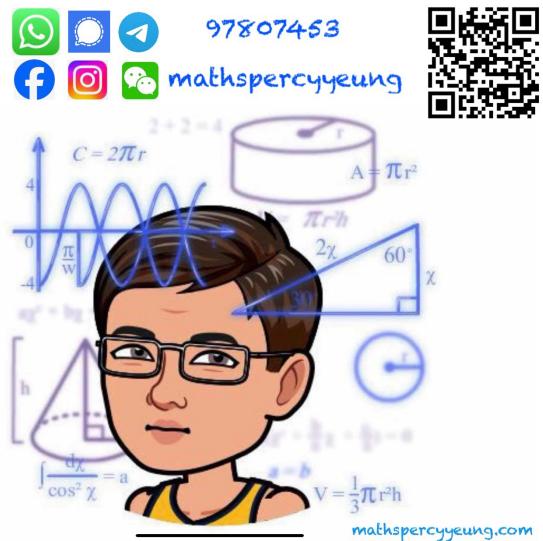
Question–Answer Book

28th October, 2024
8:15 am – 9:15 am (1 hour)

This paper must be answered in English

INSTRUCTIONS

1. Write your name, class and class number in the spaces provided on this cover.
2. Attempt ALL questions in this paper. Write your answers in the spaces provided in this Question – Answer Book.
3. Unless otherwise specified, all working must be clearly shown and numerical answers should be either exact or correct to 3 significant figures.
4. The diagrams in this paper are not necessarily drawn to scale.



Sections	Marks
A (1 – 3)	
A (4 – 12)	
A Total	/50
B Total	/20
TOTAL	/70

Section A (50 marks)

1. The volume of a glass of orange juice is 250 mL, correct to the nearest 5 mL. Find the percentage error of the measurement. (3 marks)

2. Factorize

$$(a) \quad 100 - a^2,$$

$$(b) \quad 10b + ab + 100 - a^2.$$

(3 marks)

3. (a) Make t the subject of the formula $v = \frac{2u}{1+t}$.
 (b) If $u = 3$ and $v = -1$, find the value of t .

(4 marks)

4. Simplify the following and express the answers with positive indices.

$$(a) \quad (x^0 y^3)^2 \times (2x^4 y^{-5})^3$$

$$(b) \quad (ab^{-2}) \div \left(\frac{b}{a^0} \right)^{-1}$$

(6 marks)

5. Factorize

$$(a) \quad m^2 + 5m + 4,$$

$$(b) \quad 12q^2 - 2pq - 4p^2.$$

(3 marks)

6. If n is a positive integer, simplify $3^{4n} \times 9^3 \div 27^{n+1}$. (3 marks)

7. (a) Express the following numbers in scientific notation.

(i) 9 720 000 000
 (ii) 0.000 000 13

(b) Hence, or otherwise, evaluate $\frac{0.000\ 000\ 13 \times 10^5}{9\ 720\ 000\ 000}$ and express the answer in scientific notation. (Give your answer correct to 1 decimal place if necessary.)

(4 marks)

8. (a) Express 11001_2 in the expanded form.
(b) Write down the place value of the underlined digit in $6\underline{2}71_{10}$.
(c) Convert 85_{10} into a binary number by short division.

(4 marks)

9. (a) Solve the inequality $3x+8 > 7$ and represent the solution graphically.

(b) Solve the inequality $-\frac{5+3t}{2} \leq -3t+4$ and represent the solution graphically

(c) Write down the largest prime number satisfying the inequality in (b).

(7 marks)

10. Mr. Chan earned \$26 000 last month. It is known that the amount earned by Mr. Chan this month increased by 5% from last month, but the amount earned next month will decrease by 20% from this month.

(a) Find the amount earned by Mr. Chan next month.

(b) Find the overall percentage change in the amount earned by Mr. Chan from last month to next month.

(4 marks)

11. The lengths of the sides of a triangle are 9 cm, $(6+x)$ cm and $(x-2)$ cm. If the perimeter of the triangle is not greater than 40 cm, find the largest possible integer of x .

(4 marks)

12. Consider the salaries tax rates as follows.

Net chargeable income	Tax rates
On the first \$50 000	2%
On the next \$50 000	6%
On the next \$50 000	10%
On the next \$50 000	14%
Remainder	17%

The annual income of Anson is \$750 000. If he has an allowance of \$138 000, find

- (a) his net chargeable income,
- (b) his salaries tax payable.

(5 marks)

Section B (20 marks)

13. Johnny deposited \$ P in Bank A on simple interest at the beginning of 2010. The interest rate is 3% p.a. for the first year and 4% p.a. for subsequent years. He obtained a total interest of \$880 at the beginning of 2013.

(a) Find the value of P . (3 marks)

(b) At the beginning of which year did Johnny obtain a total interest of \$2 160? (4 marks)

(c) If Johnny deposits \$ P in Bank B at an interest rate of 3% p.a., compounded half-yearly at the beginning of 2010, find the total interest he obtained at the beginning of 2017. (Give your answer correct to the nearest dollar.) (3 marks)

14. (a) (i) Factorize $49m^2 - 144n^2$.
(ii) Factorize $14m^2 + 46mn - 120n^2$.

(3 marks)

(b) Hence, or otherwise, factorize

$$14(2x-2y)^2 + 46(2x-2y)(x-2y) - 120(x-2y)^2. \quad (3 \text{ marks})$$

(c) Hence, or otherwise, simplify

$$\frac{12x+60y}{14(2x-2y)^2+46(2x-2y)(x-2y)-120(x-2y)^2} \div \frac{3}{49x^2-144y^2}. \quad (4 \text{ marks})$$

END OF PAPER