

2021-2022 S5
1st TERM UT
MATH CP
PAPER 1

2021 – 2022
S5 First Term Uniform Test

MATHEMATICS Compulsory Part PAPER 1

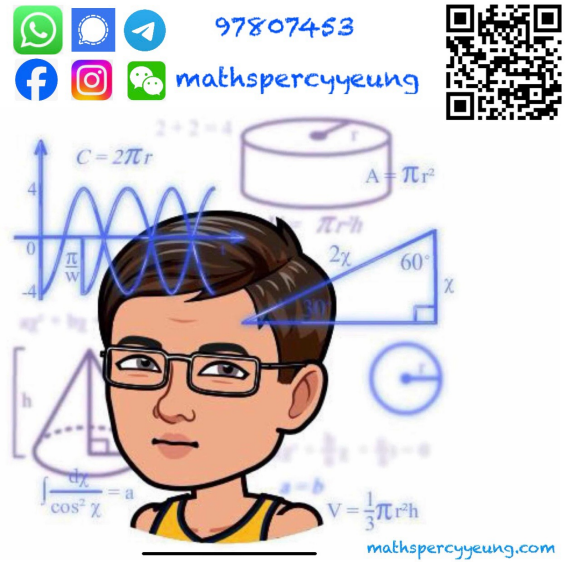
Question–Answer Book

8th November, 2021
8:15 am – 9:15 am (1 hour)

This paper must be answered in English

INSTRUCTIONS

- Write your name, class and class number in the spaces provided on this cover.
- This paper consists of THREE sections, A(1), A(2) and B.
- Attempt ALL questions in this paper. Write your answers in the spaces provided in this Question – Answer Book. Do not write in the margins. Answers written in the margins will not be marked.
- 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.



Sections	Marks
A (1 – 2)	
A (3 – 7)	
A Total	/33
B Total	/17
TOTAL	/50

Section A(1) (15 marks)

1. Simplify $\frac{x^{-9}y^{10}}{(-2x^4y)^5}$ and express your answer with positive indices. (3 marks)

2. Factorize

(a) $6x^2 + 7xy - 3y^2$,

(b) $6x^2 + 7xy - 3y^2 - 6x - 9y$.

(3 marks)

3. Consider the compound inequality

$$\frac{3x}{7} - \frac{1}{3} > \frac{x}{2} \text{ or } 3x + 18 \leq 0 \dots\dots\dots(*).$$

- (a) Solve (*).

- (b) Write down the greatest integer satisfying (*).

(4 marks)

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4. The scores of 10 students in a quiz are 45, 75, 60, 65, 55, 50, 50, 55, k and 85. Given that the mean score is 61.
- (a) Find the value of k .
- (b) Find the range and the inter-quartile range of the scores.

(5 marks)

Section A(2) (18 marks)

5. In Figure 1, the straight line $L_1: 3x + by - 24 = 0$ cuts the y -axis at $A(0, -6)$ and the straight line L_2 cuts the x -axis at $C(5, 0)$. L_1 and L_2 intersect at $B(4, k)$.

- (a) Find the values of b and k . (2 marks)
- (b) L_3 is a straight line passing through B and perpendicular to L_2 . Find the equation of L_3 . (3 marks)

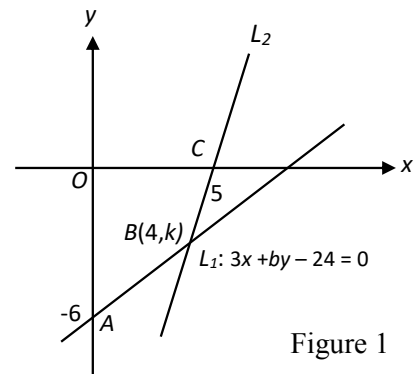


Figure 1

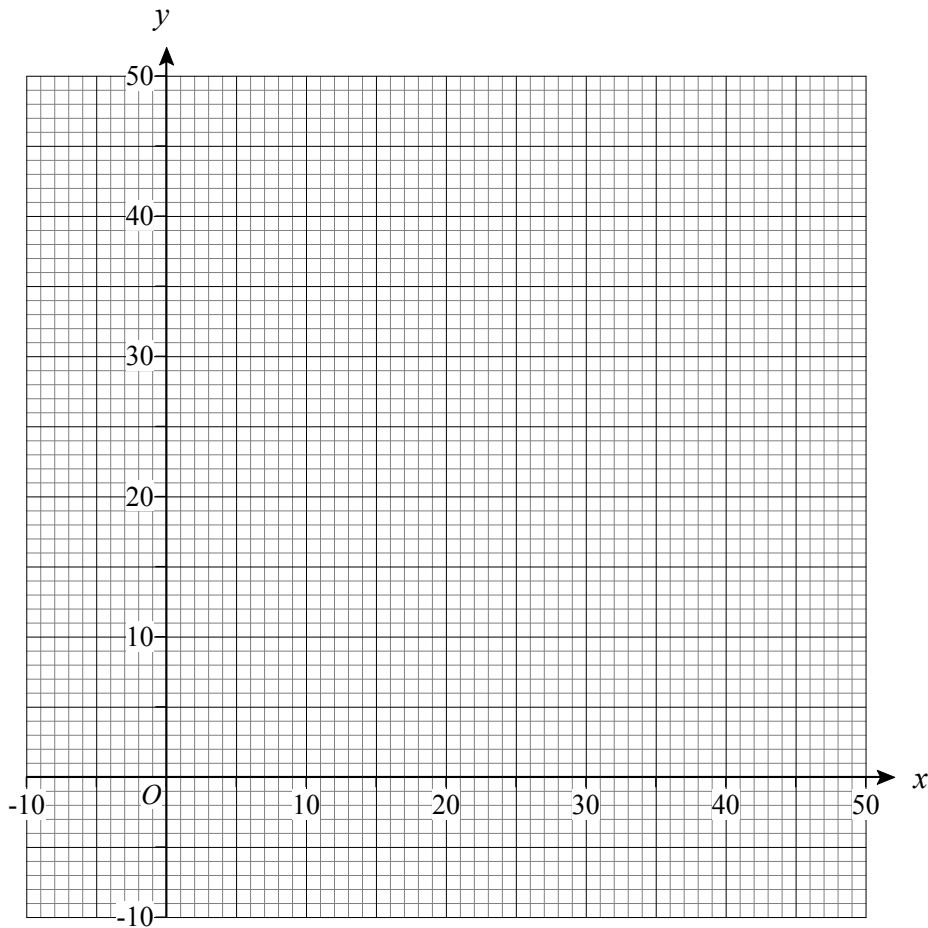
Answers written in the margins will not be marked

6. A teacher organizes a China trip for his students through a travel agency. The charge (C) for each person partly varies as the number of days (D) of the trip and partly varies inversely as the square root of the number of people (N) joining the trip. When a total of 25 students and teachers join the trip for 5 days, the charge for each person is \$2900. When a total of 64 students and teachers join the trip for 3 days, the charge for each person is \$1750.
- (a) When a total of 100 students and teachers join the trip for 4 days, how much should each person pay? (4 marks)
- (b) Now, 42 students and 7 teachers join the trip for 5 days. The travel agency takes 85% of the money as the operation cost and the remaining will be shared among 3 tour guides equally. The basic salary of a tour guide in a 5-day trip is \$2500. The travel agency claims that each tour guide can earn more than \$9500 in this tour. Do you agree? Explain your answer. (2 marks)

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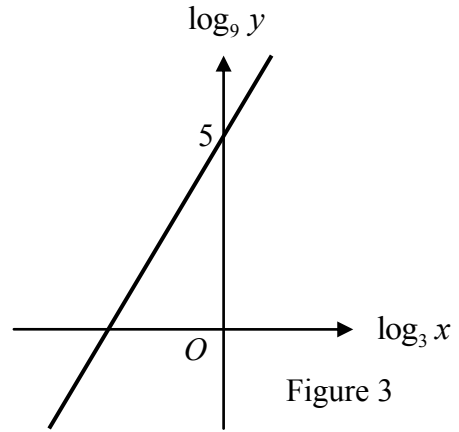
8. (b)



9. The number of students infected by a disease (N) in a campus is estimated by $N = 4000(1 - 1.01^{-t})$, where t is the number of days after the outbreak.

- (a) How many students are infected by the disease 4 days after the outbreak? (Give your answer correct to the nearest integer.) (2 marks)
- (b) If the number of students are infected by the disease in the campus is greater than 400, the campus will be closed for sterilization. Will the campus be closed 11 days after the outbreak? Explain your answer. (2 marks)

10. Figure 3 shows the linear relation between $\log_9 y$ and $\log_3 x$. The slope and the y -intercept are 3 and 5 respectively. Express the relation between x and y in the form $y = Ax^k$, where A and k are constants. (4 marks)



END OF PAPER