An Institute of

NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE

NIE MATHEMATICS CHALLENGE 2025

(Secondary One Category)

Certificate of Participation with High Distinction

is presented to

DYLAN MATHEUS TERREN RAMIREZ

of

NAN HUA HIGH SCHOOL

Associate Professor Toh Tin Lam
Head, Mathematics & Mathematics Education
National Institute of Education

www.nie.edu.sg

NIE MATHEMATICS CHALLENGE

30 Jul 2025
DYLAN MATHEUS TERREN RAMIREZ
NAN HUA HIGH SCHOOL

Dear DYLAN MATHEUS TERREN RAMIREZ,

Congratulations for being one of the 1234 participants in the NIE Mathematics Challenge 2025, in the Secondary One Category! We are glad that you took part in this challenge.

Your score is **23** out of 25, we encourage you to review your performance using the detailed breakdown provided below. This will help you identify areas for improvement and guide your future learning.

Performance Breakdown:

Strand	Topic	Number of Questions	Number of correct responses
Algebra	Algebraic expressions and formulae	3	2
	Equations	5	5
	Problem solving	3	3
Number	Approximation and estimation	1	1
	Factors and multiples	2	1
	Numbers	10	10
	Problem solving	1	1

Domain	Number of Questions	Number of correct responses
CC – Concept	13	11
SK - Skills	9	8
RS - Reasoning	12	11
AP - Application	8	8
PS - Problem solving	6	6

To gain a deeper understanding of the solutions and identify potential misconceptions, you may refer to the Question Booklet and the comments/feedback in the tables attached. These resources will provide valuable insights to help you learn and grow.

Your **Certificate of Participation with High Distinction** is attached, acknowledging your involvement in the NIE Mathematics Challenge.

Hope that you have enjoyed participating in this mathematical journey. Keep doing mathematics, and we wish you all the best in your future endeavours!

Warm regards,
Associate Professor Toh Tin Lam
Head, Mathematics and Mathematics Education
National Institute of Education

Comments/Feedback to your responses

Below, you'll find personalized feedback tailored to your responses for each question.
(*Note: "X" denotes that the question was left unanswered.*)

Qn	Correct Answer	Your response	Comments / Feedback
1	D	✓	**You have answered correctly.** You might like to look at our solution. $\frac{6}{111} = 0.054054 \ldots \approx 0.0541$ when corrected to 3 significant figures.
2	D	✓	**You have answered correctly.** You might want to look at our solution. Prime numbers between 40 and 60 are 41, 43, 47, 53 and 59. The sum of all these prim numbers is 243.
3	D	B	$72 = 2^3 \times 3^2$, has 12 factors, which is not the most. Please look at our solution. The traditional way is to list out all the factors systematically. Alternatively, do the following steps: 1) find the prime factorisation of the number. 2) increase each exponent in the index form by one. 3) multiply those results together. The number with the most factor is $210 = 2^1 \times 3^1 \times 5^1 \times 7^1$, which has $(1+1)(1+1)(1+1)(1+1) = 16$ factors.
4	D	✓	**You have answered correctly.** You might want to look at our solution. Without context, the number 299690 is 299600 when corrected to 4 significant figures, is 300000 when corrected to 3 significant figures, is 300000 when corrected to 2 significant figures, and is 300000 when corrected to 1 significant figure.
5	B	✓	**You have answered correctly.** You might want to look at our solution. The smallest and largest prime numbers between 10 and 40 is $p = 11$ and $q = 37$ respectively. The product of p and q is $11 \times 37 = 407$.
6	D	E	Please look at our solution. $(6xy + 3z - t) - 2\left(xy - 3t + \frac{3z}{2}\right)$ $= 6xy + 3z - t - 2xy + 6t - 3z$ $= 4xy + t.$
7	C	✓	**You have answered correctly.** You might want to look at our solution. $\sqrt[3]{27} = 3$, $\sqrt[3]{64} = 4$ and $\sqrt[3]{-8} = -2$ are integers so they are rational numbers. $0.\dot{3} = \frac{1}{3}$ is a rational number. $\sqrt{2}$ and $\frac{\sqrt{8}}{4} = \frac{\sqrt{2}}{2}$ are irrational numbers. So (I) is false, (II) is true, (III) is true and (IV) is false. Only statements (II) and (III) are true. (C) is the correct answer.
8	C	✓	**You have answered correctly.** You might like to look at our solution. Let the area of ΔABC be x and that of ΔSUT be y. So shaded area $= \frac{1}{4}x$. $x : y = 2 : 3 \implies y = \frac{3}{2}x$. So, $\frac{3}{2}x - \frac{1}{4}x = 95 \implies x = 76$ cm^2. Alternatively, using equivalent ratio of $\Delta ABC : \Delta SUT = 2 : 3 = 4 : 6$. Shaded area is 1 part. Unshaded portion of ΔSUT is 5 parts. Therefore, area of $\Delta ABC = \frac{4}{5} \times 95 = 76$ cm^2.

Qn	Correct Answer	Your response	Comments / Feedback
9	B	✓	**You have answered correctly.** You might like to look at our solution. Given $x:y:z = 4:5:6$, x is 4 parts out of 15 parts from $x + y + z$. Thus, $x = \frac{4}{15} \times 3 = \frac{4}{5}$.
10	D	✓	**You have answered correctly.** You might want to look at our solution. For this question, every statement needs to be analysed carefully. (I) is false. A counter example is 2 + (-3) = -1, is negative. (II) is always true as $(2n + 1)(2m + 1) = 2(2mn + m + n) + 1$, is always odd. (III) is false. A counter example is -3 – (-4) = 1, is positive. (IV) is false as odd + even + even is always odd. Therefore, only statement (II) is true.
11	C	✓	**You have answered correctly.** You might want to look at our solution. Let the number of chickens be $4x + 1$ and the number of chickens can also be $5(x – 1)$. $4x + 1 = 5(x – 1) \Longrightarrow x = 6$. So, the number of chickens = 4(6) + 1 = 25.
12	B	✓	**You have answered correctly.** You might want to look at our solution. $6 = 2 \times 3$; $12 = 2^2 \times 3$; $15 = 3 \times 5$. LCM (6, 12, 15) $= 2^2 \times 3 \times 5 = 60$ mins. So, they next leave the interchange together at 0900.
13	C	✓	**You have answered correctly.** You might want to look at our solution. When $t = 2.5$, $H = 85 – 5(2.5) = 72.5$ m above ground level. The vertical distance travelled is simply 5(2.5) = 72.5 m.
14	C	✓	**You have answered correctly.** You might want to look at our solution. The number n is a multiple of $175 = 5^2 \times 7$ and n cannot have 2 as a prime factor since the HCF with $700 = 5^2 \times 7 \times 2^2$ is 175. So, the largest number n (less than 1200) is $n = 175 \times 5 = 875$.
15	A	✓	**You have answered correctly.** You might want to look at our solution. The rate of increase is: $\frac{23 - (-5)}{12} = \frac{7}{3}$ ºC per minute. Temperature of the chicken increases by $6 \times \frac{7}{3} = 14$ ºC after 6 minutes. Therefore, the temperature of the chicken after 6 minutes is $(-5 + 14)$ ºC = 9 ºC.
16	C	✓	**You have answered correctly.** You might want to look at our solution. Total number of pears left after 1st day = $3y – 15$. Total number of oranges left after 1st day = $\frac{2}{3}y$. Total number of fruits left after 1st day = $\frac{2}{3}y + 3y - 15 = \frac{11}{3}y - 15$.
17	A	✓	**You have answered correctly.** You might want to look at our solution. Total number of fruits left after the 1st day is $\frac{11}{3}y – 15$. Total number of fruits left after the 2nd day is $\frac{11}{3}y – 15 – 10 – 7 = 78$. $\frac{11}{3}y - 32 = 78 \Longrightarrow 11y - 96 = 234 \Longrightarrow y = 30$.

Qn	Correct Answer	Your response	Comments / Feedback
18	D	✓	**You have answered correctly.** You might want to look at our solution. Number of English books removed $= 32 \times \frac{3}{4} = 24$. Number of German books removed $= 20 \times \frac{3}{10} = 6$. Altogether 30 books out of 52 books removed so 22 books remained. Fraction of the number of books left on the bookshelf, $p = \frac{22}{52} = \frac{11}{26}$.
19	D	✓	**You have answered correctly.** You might want to look at our solution. If a number x corrected to 2 significant figures is 60, it means x is greater than or equal to 59.5 and is less than 60.5. Which can be written as $59.5 \leq x < 60.5$. Thus, $59.5 \leq 50A < 60.5 \quad \Rightarrow 1.19 \leq A < 1.21$.
20	C	✓	**You have answered correctly.** You might want to look at our solution. Observe the number patterns carefully – • above the horizontal row, the number of unit squares = the diagram number. • in the horizontal row, the number of unit squares = 2 × (diagram number + 1). Diagram 1: 1 + 4 = 1 + 2(1 + 1) = 5; Diagram 2: 2 + 6 = 2 + 2(2 + 1) = 8; Diagram 3: 3 + 8 = 3 + 2(3 + 1) = 11; … Diagram 50: 50 + 2(50 + 1) = 152.
21	43	✓	**You have answered correctly.** You might like to look at our solution. Using algebra, let the number be x. $(x + 5) \div 4 = 54 \quad \Rightarrow x = 54 \times 4 - 5 \quad \Rightarrow x = 211$ Therefore, the correct answer is $(211 + 4) \div 5 = 43$.
22	25	✓	**You have answered correctly.** You might like to look at our solution. Prime factorise $20295 = 41 \times 11 \times 5 \times 3^2$ and note that the youngest child is more than 3 years old. So, the ages of 3 children must be 5, 9 and 11. The sum of the 3 children ages is 5 + 9 + 11 = 25.
23	6	✓	**You have answered correctly.** You might like to look at our solution. Let x be the number of questions that is answered correctly, y be the number of questions answered wrongly and z be the number questions not answered. The total score is obtained by $4x - 2y - z = 17$ The total number of questions is $x + y + z = 10$ Adding the above equations, $5x - y = 27 \Rightarrow 5x = 27 + y$ For a total score of 17 in the 10-question quiz, $5 \leq x < 10 \Rightarrow 0 < y \leq 5$ It can be deduced that $(27 + y)$ is divisible by 5. Therefore $y = 3$ and $5x = 27 + 3 \Rightarrow x = 6$. The number of questions with correct answers must be 6.

Qn	Correct Answer	Your response	Comments / Feedback
24	15	✓	**You have answered correctly.** You might like to look at our solution. Let cards A, B, C, D and E cover a, b, c, d and e respectively. So, $b + c + d + e = 10$; $c + d + e + a = 13$; $d + e + a + b = 11$; $e + a + b + c = 12$; $a + b + c + d = 14$. Adding all the equations, $4(a + b + c + d + e) = 60 \quad \Rightarrow a + b + c + d + e = 15$.
25	2033	✓	**You have answered correctly.** You might like to look at our solution. General term for Sequence A: $6n - 1$ General term for Sequence B: $11m - 2$ Let $6n - 1 = 11m - 2$ $6n = 11m - 1 = 12m - (1 + m)$ $n = 2m - \frac{1+m}{6}$ From above, the smallest integer value of n occurs when $m = 5$, and $n = 10 - 1 = 9$. Therefore, the first number that is common in both sequences is 6(9) – 1 = 53 or 11(5) – 2 = 53. LCM (6, 11) = 66. Terms that are common in Sequence A and Sequence B can be represented by $53 + 66k$. Let $53 + 66k > 2025$. So, $66k > 1972 \Rightarrow k > 29.8$ The least integer $k = 30$. The smallest integer greater than 2025 which is in both sequences is 66(30) + 53 = 2033.

※ End of report ※