



# THAILAND INTERNATIONAL MATHEMATICAL OLYMPIAD HEAT 2019 (HONG KONG REGION)

## Primary 5

Time allowed: 90 minutes

### Question Paper

#### Instructions to Contestants:

1. Each contestant should have ONE Question-Answer Book which CANNOT be taken away.
2. There are 5 exam areas and 5 questions in each exam area. There are a total of 25 questions in this Question-Answer Book. Each carries 4 marks. Total score is 100 marks. No points are deducted for incorrect answers.
3. All answers should be written on ANSWER SHEET.
4. NO calculators can be used during the contest.
5. All figures in the paper are not necessarily drawn to scale.
6. This Question-Answer Book will be collected at the end of the contest.

THIS Question-Answer Book CANNOT BE TAKEN AWAY.

DO NOT turn over this Question-Answer Book without approval of the examiner.  
Otherwise, contestant may be DISQUALIFIED.

All answers should be written on the ANSWER SHEET.

Open-Ended Questions (1<sup>st</sup> ~25<sup>th</sup>) (4 points for correct answer, no penalty point for wrong answer)

**Logical Thinking**

- Andy's father's age this year minus 2, is divided by 4, adds 7 and is multiplied by 12. The result will be 252 years old. How old is Andy's father this year?  
Umur Ayah Andy tahun ini dikurangi 2, dibagi 4, ditambah 7 dan dikali 12. Hasilnya adalah 252 tahun. Berapa umur Ayah Andy tahun ini?
- There are a total of 30 chickens and rabbits in a farm. The animals have a total of 74 legs. How many rabbit(s) is / are there?  
Terdapat 30 ayam dan kelinci secara keseluruhan di sebuah peternakan. Hewan-hewan tersebut mempunyai total 74 kaki. Berapa banyak kelinci yang ada di sana?
- There are 16 blue balls, 28 red balls and 30 green balls in a bag. At least how many balls should be picked up to ensure there are 5 balls for each colour?  
Terdapat 16 bola biru, 28 bola merah dan 30 bola hijau di dalam sebuah kantong. Setidaknya berapa banyak bola harus diambil untuk memastikan ada 5 bola dari masing-masing warna?
- It requires 8 people to take 21 days to complete a task. How many day(s) is / are needed for 12 people to finish the same task?  
Diperlukan 8 orang untuk menyelesaikan sebuah tugas dalam 21 hari. Berapa hari yang diperlukan 12 orang untuk menyelesaikan tugas yang sama?
- According to the pattern shown below, how many ✖ is / are there in the 10<sup>th</sup> group?  
Berdasarkan pola di bawah ini, ada berapa banyak ✖ pada Kelompok 10?

✖
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✖		✖
✖		✖
✖	✖	✖

✖		✖	✖	✖
✖		✖		✖
✖		✖		✖
✖				✖
✖	✖	✖	✖	✖

✖		✖	✖	✖	✖	✖
✖		✖				✖
✖		✖		✖		✖
✖		✖		✖		✖
✖		✖	✖	✖		✖
✖						✖
✖	✖	✖	✖	✖	✖	✖

1<sup>st</sup> Group  
Kelompok 1

2<sup>nd</sup> Group  
Kelompok 2

3<sup>rd</sup> Group  
Kelompok 3

4<sup>th</sup> Group  
Kelompok 4

Question 5  
Soal nomor 5

Write down the answer in the simplest form. If the calculation result is a fraction, please write down the answer as a proper or mixed fraction, decimal figure is also accepted. Marks will NOT be given for incorrect unit.

All answers should be written on the ANSWER SHEET.

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### Arithmetic

6. Find the value of  $x$  if  $\frac{3x-8}{7} = 7$ .

Carilah nilai dari  $x$  jika  $\frac{3x-8}{7} = 7$ .

7. Find the value of  $16+20+24+\dots+64+68$ .

Carilah nilai dari  $16+20+24+\dots+64+68$ .

8. Find the value of  $13 \times 81 + 27 \times 12 - 9 \times 123$ .

Carilah nilai dari  $13 \times 81 + 27 \times 12 - 9 \times 123$ .

9. Find the value of  $\frac{1}{7 \times 8} + \frac{1}{8 \times 9} + \dots + \frac{1}{26 \times 27} + \frac{1}{27 \times 28}$ .

Carilah nilai dari  $\frac{1}{7 \times 8} + \frac{1}{8 \times 9} + \dots + \frac{1}{26 \times 27} + \frac{1}{27 \times 28}$ .

10. Find the value of  $\left(\frac{5}{3} + \frac{5}{6} + \frac{5}{9} + \frac{5}{12}\right) \div \left(\frac{8}{6} + \frac{8}{12} + \frac{8}{18} + \frac{8}{24}\right)$ .

Carilah nilai dari  $\left(\frac{5}{3} + \frac{5}{6} + \frac{5}{9} + \frac{5}{12}\right) \div \left(\frac{8}{6} + \frac{8}{12} + \frac{8}{18} + \frac{8}{24}\right)$ .

### Number Theory

11. If a 9-digit number  $\overline{20204621A}$  is divisible by 11, find the value of  $A$ .

Jika sebuah bilangan 9-angka  $\overline{20204621A}$  dapat dibagi 11, carilah nilai dari  $A$ .

12. Define the operation symbol  $a \otimes b = \frac{(a+b) \times (a-b)}{(a-1) \times b}$ ,  $a \neq 1$  and  $b \neq 0$ , find the value of  $19 \otimes (6 \otimes 4)$ .

Didefinisikan simbol operasi  $a \otimes b = \frac{(a+b) \times (a-b)}{(a-1) \times b}$ ,  $a \neq 1$  dan  $b \neq 0$ , carilah nilai dari  $19 \otimes (6 \otimes 4)$ .

13. How many 3-digit numbers that can be divisible by 11 or 19 is / are there?

Ada berapa banyak bilangan 3-angka yang dapat dibagi 11 atau 19?

14. The sum of two positive numbers  $A$  and  $B$  is 198. Find the minimum value of the product of  $A$  and  $B$ .

Hasil penjumlahan dua bilangan positif  $A$  dan  $B$  adalah 198. Carilah nilai minimum dari hasil kali  $A$  dan  $B$ .

15. Find the last 2 digits of  $6 \times 16 \times 26 \times 36 \times \dots \times 216$ .

Carilah dua angka terakhir dari bilangan hasil kali  $6 \times 16 \times 26 \times 36 \times \dots \times 216$ .

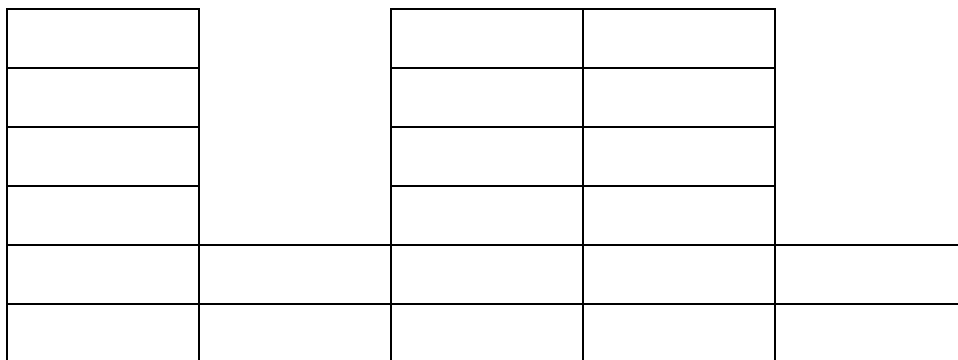
Write down the answer in the simplest form. If the calculation result is a fraction, please write down the answer as a proper or mixed fraction, decimal figure is also accepted. Marks will NOT be given for incorrect unit.

All answers should be written on the ANSWER SHEET.

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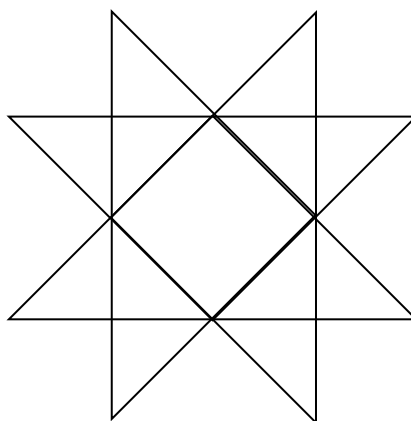
**Geometry**

16. How many rectangle(s) is / are there in the figure below?  
Ada berapa banyak persegi panjang yang ada pada gambar di bawah ini?



Question 16  
Soal nomor 16

17. How many side(s) does a regular polygon have which has  $36^\circ$  exterior angle?  
Berapa banyak sisi yang dimiliki sebuah segibanyak beraturan dengan sudut luar  $36^\circ$ ?
18. How many right-angled triangle(s) is / are there in the figure below?  
Berapa banyak segitiga siku-siku yang ada pada gambar di bawah ini?



Question 18  
Soal nomor 18

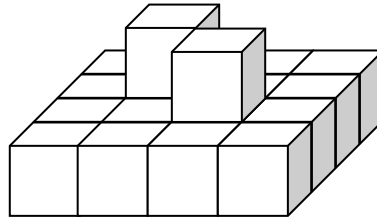
Write down the answer in the simplest form. If the calculation result is a fraction, please write down the answer as a proper or mixed fraction, decimal figure is also accepted. Marks will NOT be given for incorrect unit.

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19. 18 small cubes with side length 1 cm are combined. According to the pattern shown below, find the surface area in  $\text{cm}^2$ .

18 kubus kecil dengan panjang sisi 1 cm tersusun sebagai berikut. Carilah luas permukaan bangun ini dalam  $\text{cm}^2$ .



Question 19  
Soal nomor 19

20. A square is formed by 162 rectangles that are  $1\text{cm} \times 2\text{cm}$ . Find the decrease in perimeter in cm.  
Sebuah bujursangkar terbentuk dari 162 persegi panjang yang ukurannya adalah  $1\text{cm} \times 2\text{cm}$ . Carilah penurunan keliling yang terjadi.

### Combinatorics

21. How many way(s) is / are there to split 256 students in groups of equal sizes?  
Berapa banyak cara yang ada untuk mengelompokkan 256 murid dalam jumlah yang sama?
22. A flight of stairs has 11 steps. Peter can go up for 1 step or 3 steps each time. How many way(s) is / are there for Peter to go up the stairs?  
Sebuah tangga mempunyai 11 anak tangga. Peter dapat menaiki tangga tersebut 1 atau 3 anak tangga tiap melangkah naik. Berapa banyak cara berbeda Peter dapat menaiki tangga tersebut?
23. Choose 3 digits, without repetition, from 1, 3, 5, 7, 9 to form 3-digit numbers. How many number(s) can be divisible by 11?  
Pilihlah 3 angka, tanpa pengulangan, dari 1, 3, 5, 7, 9 untuk membentuk bilangan 3-angka. Berapa banyak bilangan yang dapat dibagi 11?
24. Numbers are drawn from the 81 integers 100 to 180. At least how many numbers are drawn at random to ensure that there are two numbers whose sum is 200?  
Bilangan diambil dari 81 bilangan bulat dari 100 sampai 180. Setidaknya berapa banyak bilangan yang harus diambil secara acak untuk memastikan bahwa ada dua bilangan yang hasil penjumlahannya adalah 200?

All answers should be written on the ANSWER SHEET.

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25. 5 identical black books and 4 identical white books are put from left to right. How many different permutation(s) is / are there?  
5 buku hitam identik dan 4 buku putih identik diletakkan dari kiri ke kanan. Ada berapa permutasi berbeda yang bisa dilakukan?

**~ End of Paper ~**