



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

## Primary 6

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.

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

**Logical Thinking**

1. There are 16 pieces of white chopsticks, 27 pieces of yellow chopsticks and 46 pieces of blue chopsticks mixed together. If you want to get 2 pairs of white chopsticks and 3 pairs of chopsticks with other different colours in the dark, at least how many pieces of chopsticks are needed to be taken?  
Terdapat 16 sumpit putih, 27 sumpit kuning dan 46 sumpit biru yang dicampur bersama. Jika dalam gelap kamu ingin mendapatkan 2 pasang sumpit putih dan 3 pasang sumpit bukan putih, berapa banyak sumpit yang perlu kamu ambil?
2. There are some chickens and rabbits in a cage. The number of chickens is 4 times as the number of rabbits. They have 222 legs in total. How many chicken(s) is / are there?  
Terdapat beberapa ayam dan kelinci di dalam kandang. Jumlah ayam 4 kali lebih banyak dari jumlah kelinci. Mereka mempunyai total 222 kaki. Ada berapa ayam dalam kandang itu?
3. It requires 16 minutes to cut a piece of wood into 9 sections. If the time required to cut into each section is the same, how many minute(s) is / are required to cut the wood into 11 sections?  
Diperlukan 16 menit untuk memotong sepotong kayu menjadi 9 bagian. Jika waktu yang diperlukan untuk memotong tiap-tiap potongan adalah sama, berapa menit yang diperlukan untuk memotong kayu serupa menjadi 11 bagian?
4. Find the average of the following 8 numbers.  
Carilah rata-rata dari 8 bilangan di bawah ini.

2019 、 2065 、 2046 、 1985 、 2034 、 1922 、 46 、 1827

5. Leo needs 18 days to finish a project. Bruce needs 21 days to finish the same project. If Leo, Bruce and Mary do the project together, it takes 9 days. How many days does Mary take to finish the project alone?  
Leo memerlukan 18 hari untuk menyelesaikan sebuah proyek. Bruce memerlukan 21 hari untuk menyelesaikan proyek yang sama. Jika Leo, Bruce dan Mary mengerjakan proyek tersebut bersama-sama, diperlukan waktu 9 hari. Berapa hari yang diperlukan Mary jika dia mengerjakan proyek tersebut sendiri?

**Arithmetic**

6. Find the value of  $1+4+7+\dots+31+34$ .  
Carilah nilai dari  $1+4+7+\dots+31+34$ .
7. Find the value of  $1369\times 1722-1364\times 1717$ .  
Carilah nilai dari  $1369\times 1722-1364\times 1717$ .
8. Find the value of  $\frac{1}{110}+\frac{1}{132}+\dots+\frac{1}{342}+\frac{1}{380}$ .  
Carilah nilai dari  $\frac{1}{110}+\frac{1}{132}+\dots+\frac{1}{342}+\frac{1}{380}$ .

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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9. Find the value of  $2\frac{1}{400}\times 169+5\frac{1}{800}\times 10+4\frac{1}{200}\times 113$ .

Carilah nilai dari  $2\frac{1}{400}\times 169+5\frac{1}{800}\times 10+4\frac{1}{200}\times 113$ .

10. Find the value of  $1+3+9+\dots+59049$ .

Carilah nilai dari  $1+3+9+\dots+59049$ .

### Number Theory

11. If a 9-digit number  $\overline{202015A2B}$  is divisible by 12 and  $A, B \neq 0$ , find the the sum of possible value of  $\overline{AB}$ .

Jika sebuah bilangan 9-angka  $\overline{202015A2B}$  dapat dibagi 12 dan  $A, B \neq 0$ , carilah hasil penjumlahan dari nilai yang mungkin dari  $\overline{AB}$ .

12. Find the last digit of A if  $A = 5 + 12 + 19 + 26 + \dots + (5 + 7 \times 99) + (5 + 7 \times 100)$ .

Carilah angka terakhir dari A jika  $A = 5 + 12 + 19 + 26 + \dots + (5 + 7 \times 99) + (5 + 7 \times 100)$ .

13. Find the number of all positive factors of 996.

Carilah ada berapa banyak faktor positif dari 996.

14. The remainder of dividing a positive integer  $K$  by 17 is 11. What is the remainder of dividing  $(6K + 16)$  by 17?

Sisa dari membagi  $K$  dengan 17 adalah 11. Berapa sisa dari membagi  $(6K + 16)$  dengan 17?

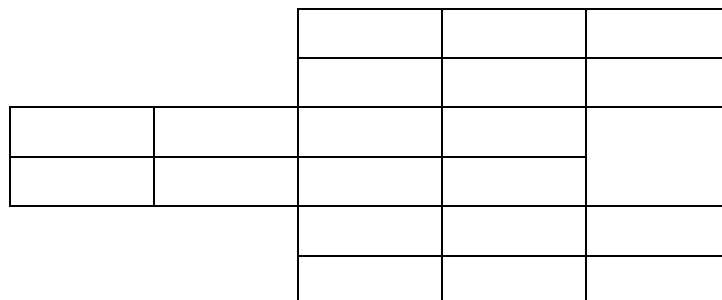
15. The sum of 25 consecutive numbers is 900. Find the second largest number.

Hasil penjumlahan dari 25 bilangan berturut-turut adalah 900. Carilah bilangan kedua terbesar.

### Geometry

16. How many rectangle(s) is / are there in the figure below?

Berapa banyak persegi panjang yang ada pada gambar di bawah ini?



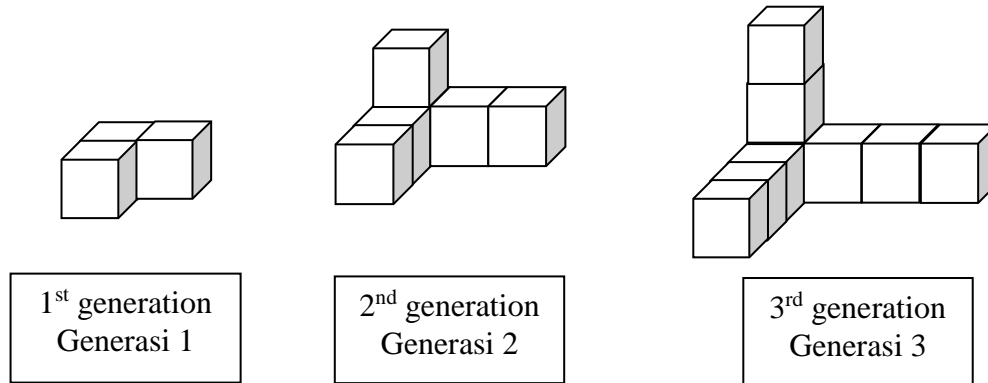
Question 16  
Soal nomor 16

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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17. Small cubes with side length 1 are combined according to the pattern shown below. Find the total volume of the 30<sup>th</sup> generation.

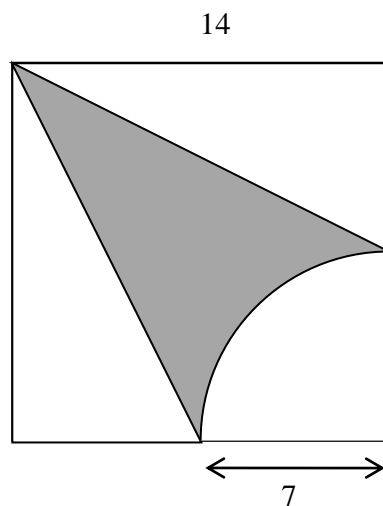
Kubus-kubus kecil dengan panjang sisi 1 disusun menurut pola di bawah ini. Carilah total volume dari Generasi 30.



Question 17  
Soal nomor 17

18. The figure below is a square overlapped by two right-angled triangles and one quarter circle. Find the perimeter of the shaded region. (Take  $\pi = \frac{22}{7}$ )

Gambar di bawah ini adalah sebuah bujursangkar yang ditumpuk dengan dua segitiga siku-siku dan sebuah seperempat lingkaran. Carilah luas area yang diarsir. (Gunakan  $\pi = \frac{22}{7}$ )



Question 18  
Soal nomor 18

All answers should be written on the ANSWER SHEET.

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19. How many rectangle(s) with both 2 "\*" is / are there in the figure below?  
Berapa banyak persegi panjang yang mengandung 2 "\*" yang ada pada gambar di bawah ini?

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Question 19  
Soal nomor 19

20. The perimeter of a circle is 18.84. If the diameter of the circle is the same as the diagonal of a square, what is the area of the square? (Take  $\pi = 3.14$ )  
Keliling sebuah lingkaran adalah 18.84. Jika garis tengah dari lingkaran itu adalah sama dengan diagonal sebuah bujursangkar, berapa luas bujursangkar tersebut? (Gunakan  $\pi = 3.14$ )

### Combinatorics

21. Choose 3 digits, without repetition, from 1, 2, 3, 6, 7, 8 to construct 3-digit numbers. Of these 3-digit numbers, how many of them are divisible by 4?  
Pilihlah 3 angka, tanpa pengulangan, dari 1, 2, 3, 6, 7, 8 untuk membentuk bilangan 3-angka. Dari bilangan-bilangan 3-angka tersebut, berapa banyak yang dapat dibagi 4?
22. A flight of stairs has 11 steps. Peter can go up for 1 step or 3 steps each time. The 6<sup>th</sup> step cannot be stepped on as it is destroyed. 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. Anak tangga ke-6 tidak dapat dipijak karena rusak. Berapa banyak cara berbeda Peter dapat menaiki tangga tersebut?
23. What is the nearest time while the hour hand and the minute hand are perpendicular to each other between 6pm and 7pm?  
Jam berapakah pertama terjadi jarum jam dan jarum menit membentuk sudut siku-siku antara jam 6 dan jam 7 malam?
24. In how many possible way(s) can 10 identical balls be distributed to 3 distinct boxes so that every box contains at least one ball?  
Dengan berapa cara 10 bola identik dapat ditaruh di 3 kotak berbeda sehingga masing-masing kotak setidaknya berisi 1 bola?

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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25. 6 identical black books and 8 identical white books are put from left to right. How many different permutation(s) is / are there?  
6 buku hitam identik dan 8 buku putih identik diletakkan dari kiri ke kanan. Ada berapa permutasi berbeda yang bisa dilakukan?

**~ End of Paper ~**