



奧冠教育中心

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泰國國際數學競賽初賽 2020 - 2021

**THAILAND INTERNATIONAL  
MATHEMATICAL OLYMPIAD  
HEAT ROUND 2020 - 2021**

小學六年級 Primary 6

時限：90 分鐘

Time allowed: 90 minutes

試題

Question Paper

考生須知：

**Instructions to Contestants:**

1. 本卷包括 試題 乙份，試題紙不可取走。

Each contestant should have ONE Question-Answer Book which CANNOT be taken away.

2. 本卷共 5 個範疇，每範疇有 5 題，共 25 題，每題 4 分，總分 100 分，答錯不扣分。

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

請以最簡形式填寫答案，若計算結果是分數，請確保為真分數或帶分數，或將計算結果寫成小數。錯誤單位將不給予任何分數。

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.

請將答案寫在 **答題紙** 上。

All answers should be written on the ANSWER SHEET.

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incorrect answers.

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4. 比賽期間，不得使用計算工具。

NO calculators can be used during the contest.

5. 本卷中所有圖形不一定依比例繪成。

All figures in the paper are not necessarily drawn to scale.

6. 比賽完畢時，本試題會被收回。

This Question-Answer Book will be collected at the end of the contest.

本試題不可取走。

**THIS Question-Answer Book CANNOT BE TAKEN AWAY.**

未得監考官同意，切勿翻閱試題，否則參賽者將有可能被取消資格。

**DO NOT** turn over this Question-Answer Book without approval of the examiner.

Otherwise, contestant may be **DISQUALIFIED**.

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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 some chickens and rabbits in a cage. The number of chickens is 3 times and 10 more as the number of rabbits. They have 110 legs in total. How many chicken(s) is / are there?

Terdapat sejumlah ayam dan kelinci pada sebuah kandang. Jumlah ayam 3 kali dan 10 lebih banyak dari jumlah kelinci. Mereka mempunyai total 110 kaki. Berapa banyak ayam ada di sana?

2. Every cell A will split into 2 cell B after 1 minute and every cell B will split into 2 cell A after 2 minutes. There are few cell A now. After 10 minutes, scientists observe 1792 cells. How many cells are there at the beginning?

Setiap sel A akan membelah menjadi 2 sel B setelah 1 menit dan setiap sel B akan membelah menjadi 2 sel A setelah 2 menit. Ada beberapa sel A sekarang. Setelah 10 menit, peneliti mengamati 1792 sel. Ada berapa banyak sel pada awalnya?

3. A book store had a box of text books. One half and 8 fewer books were sold on the first day. One half of the remaining part and 2 more books were sold on the second day. One half of the remaining part and 1 fewer books were sold on the third day. Finally, 9 books are left. How many book(s) did the box contain originally?

Sebuah toko buku memiliki satu buah kotak berisi buku-buku pelajaran. Setengah dan 8 buku terjual pada hari pertama. Setengah dari sisanya lebih 2 buku terjual pada hari kedua. Setengah dari sisanya kurang 1 buku terjual pada hari ketiga. Akhirnya, tersisa 9 buku. Berapa banyak buku yang ada pada kotak tersebut pada awalnya?

請以最簡形式填寫答案，若計算結果是分數，請確保為真分數或帶分數，或將計算結果寫成小數。錯誤單位將不給予任何分數。

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4. 5 digits,  $A, B, C, D$  and  $E$ , represent 5 different numbers from 0 to 9.

Given the following conditions:

1.  $E > D > C > B > A$
2. The sum of  $A, B$  and  $C$  is greater than  $D$ .
3. The sum of  $C$  and  $D$  equals to  $E$ .
4.  $B$  is divisible by  $C$ .
5. The sum of  $A, B$  and  $D$  is less than  $E$ .
6.  $E$  is greater than 7.

Find the digit represented by  $D$ .

5 angka,  $A, B, C, D$  dan  $E$ , melambangkan 5 angka berbeda dari 0 sampai 9.

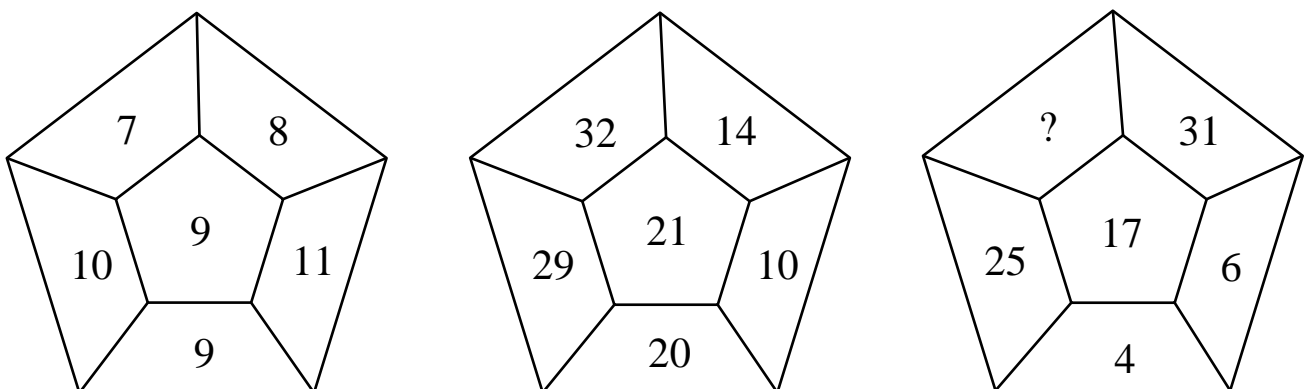
Berikut beberapa syaratnya :

1.  $E > D > C > B > A$ .
2. Hasil penjumlahan  $A, B$  dan  $C$  lebih besar daripada  $D$ .
3. Hasil penjumlahan  $C$  dan  $D$  sama dengan  $E$ .
4.  $B$  dapat dibagi  $C$
5. Hasil penjumlahan  $A, B$  dan  $D$  lebih kecil dari  $E$ .
6.  $E$  lebih besar dari 7.

Carilah angka yang dilambangkan  $D$ .

5. According to the pattern shown below, what is the number in the blank?

Berapakah bilangan yang dilambangkan oleh "?" menurut pola yang ada?



Question 5

Soal No. 5

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### Arithmetic

6. Find the value of  $3\frac{1}{3} \times 5 + 5\frac{1}{6} \times 7 + 2\frac{1}{6} \times 13$ .

**Carilah nilai dari**  $3\frac{1}{3} \times 5 + 5\frac{1}{6} \times 7 + 2\frac{1}{6} \times 13$ .

7. Find the value of  $\frac{1}{1 \times 2} + \frac{1}{2 \times 3} + \frac{1}{3 \times 4} + \dots + \frac{1}{19 \times 20} + \frac{1}{20 \times 21}$ .

**Carilah nilai dari**  $\frac{1}{1 \times 2} + \frac{1}{2 \times 3} + \frac{1}{3 \times 4} + \dots + \frac{1}{19 \times 20} + \frac{1}{20 \times 21}$

8. Find the value of  $4420 \times 2368 - 4421 \times 2367$ .

**Carilah nilai dari**  $4420 \times 2368 - 4421 \times 2367$ .

9. Convert 0.136 into the simplest fraction.

**Ubah** 0.136 **menjadi pecahan paling sederhana.**

10. Find the value of  $5 + 8 + 10 + 13 + 15 + \dots + 35 + 38 + 40$ .

**Carilah nilai dari**  $5 + 8 + 10 + 13 + 15 + \dots + 35 + 38 + 40$ .

### Number Theory

11. How many simplified fraction(s) with denominator 1386 is / are there?

**Ada berapa banyak pecahan paling sederhana dengan penyebut 1386?**

12. The remainder of dividing a positive integer  $K$  by 14 is 7. What is the remainder of dividing  $(4K + 7)$  by 12?

**Sisa pembagian bilangan bulat positif  $K$  dibagi 14 adalah 7. Berapakah sisa pembagian  $(4K + 7)$  dibagi 12?**

請以最簡形式填寫答案，若計算結果是分數，請確保為真分數或帶分數，或將計算結果寫成小數。錯誤單位將不給予任何分數。

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13. Find the last digit of  $A$  if  $A = 2^2 + 4^2 + 6^2 + 8^2 + \dots + 98^2 + 100^2$ .

Carilah angka terakhir dari  $A$  jika  $A = 2^2 + 4^2 + 6^2 + 8^2 + \dots + 98^2 + 100^2$ .

14. If a 9-digit number  $\overline{1523459A2}$  is divisible by 12, find the value of  $A$ .

Jika sebuah bilangan 9-angka  $\overline{1523459A2}$  dapat dibagi 12, carilah nilai dari  $A$ .

15. The sum of 13 consecutive numbers is 260. Find the largest number.

Hasil penjumlahan 13 bilangan berturut-turut adalah 260. Carilah bilangan terbesar.

### Geometry

16. There is a cuboid. When the length increases 4cm, the volume will be increased by  $24 \text{ cm}^3$ . When the width increases 2cm, the volume will be increased by  $24 \text{ cm}^3$ . When the height increases 7cm, the volume will be increased by  $14 \text{ cm}^3$ . What is the volume of the cuboid? (Unit in  $\text{cm}^3$ )

Terdapat sebuah balok. Ketika panjangnya ditambah 4 cm, volume balok akan meningkat  $24 \text{ cm}^3$ . Ketika lebarnya ditambah 2cm, volumenya akan meningkat  $24 \text{ cm}^3$ . Ketika tingginya ditambah 7cm, volumenya akan meningkat  $14 \text{ cm}^3$ . Berapa  $\text{cm}^3$  volume balok tersebut?

請以最簡形式填寫答案。若計算結果是分數，請確保為真分數或帶分數，或將計算結果寫成小數。錯誤單位將不給予任何分數。

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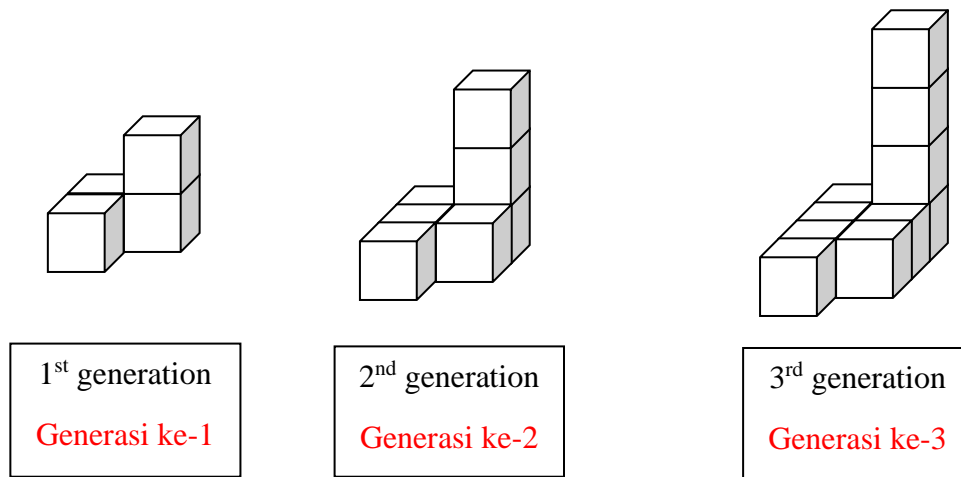
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17. Small cubes with side length 1 are combined according to the pattern shown below. Find the total volume of the 12<sup>th</sup> generation.

Kubus kecil dengan panjang sisi 1 digabungkan menurut pola di bawah ini. Carilah volume keseluruhan dari generasi ke-12.



Question 17

Soal No. 17

18. The area of a rectangle is 504. The value of its length and width are both integers. What is the minimum possible value of its perimeter?

Luas dari sebuah persegi panjang adalah 504. Nilai dari panjang dan lebar keduanya adalah bilangan bulat. Berapakah nilai minimum keliling yang mungkin?

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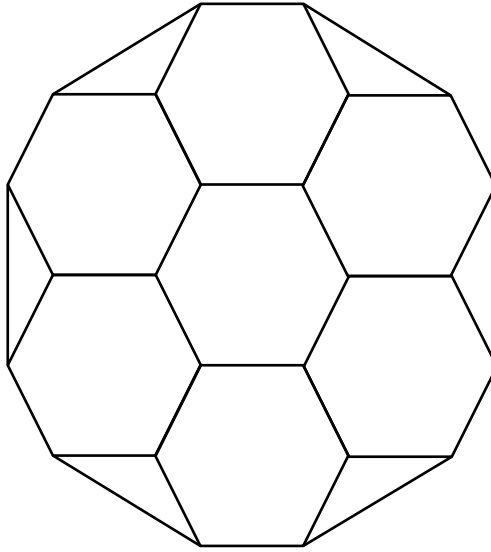
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19. The figure below is formed by 7 identical regular hexagons and 6 identical triangles. If the area of triangle is 1, find the area of the figure.

Gambar di bawah ini dibentuk dari 7 segienam identik dan 6 segitiga identik. Jika luas dari segitiga adalah 1, carilah luas dari gambar ini.



Question 19

Soal No. 19

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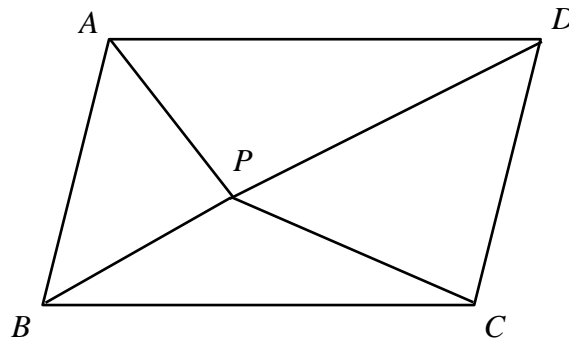
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20.  $P$  is a point in rectangle  $ABCD$ . Given that area of  $\triangle APD = 74$  and the area of  $\triangle BCP$  equals to 13% of rectangle  $ABCD$ . What is the area of rectangle  $ABCD$ ?

**P adalah sebuah titik pada persegi panjang  $ABCD$ . Diketathui luas dari  $\triangle APD = 74$  dan luas dari  $\triangle BCP$  sama dengan 13% dari persegi panjang  $ABCD$ . Berapa luas persegi panjang  $ABCD$ ?**



Question 20

**Soal No. 20**

### Combinatorics

21. Numbers are drawn from the 222 integers 1 to 222. At least how many numbers are drawn at random to ensure that there are two numbers whose difference is 32?

**Bilangan diambil secara acak dari 222 bilangan bulat dari 1 sampai dengan 222. Setidaknya berapa banyak bilangan harus diambil untuk memastikan ada dua bilangan yang selisih keduanya adalah 32?**

22. There are 9 boys and 6 girls in a class. Choose 2 boys and 2 girls to form a research group. How many way(s) is / are there in total?

**Terdapat 9 anak laki-laki dan 6 anak perempuan di dalam sebuah kelas. Pilihlah 2 anak laki-laki dan 2 anak perempuan untuk membentuk sebuah kelompok penelitian. Berapa banyak cara yang ada secara keseluruhan?**

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23. Choose 3 digits, without repetition, from 0, 2, 3, 6, 8, 9 to construct 3-digit numbers. Of these 3-digit numbers, how many of them are divisible by 3?

Pilihlah 3 angka, tanpa pengulangan, dari 0, 2, 3, 6, 8, 9 untuk membentuk bilangan 3-angka. Dari bilangan-bilangan 3-angka tersebut, berapa banyak di antaranya dapat dibagi 3?

24. How many positive integer(s) with distinct digits and less than 200 is / are there?

Ada berapa banyak bilangan bulat positif dengan angka-angka yang berbeda dan lebih kecil dari 200?

25. Counting from 1 to 6666, how many numbers are there that have exactly two digit “6”s and only one digit “7”?

Hitunglah dari 1 sampai 6666, berapa banyak bilangan yang ada yang mempunyai tepat 2 angka “6” dan hanya satu angka “7”?

~ 全卷完 ~

~ End of Paper ~

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