



MiMAS

学生资料

# 马来西亚数学邀请赛

## MALAYSIA MATHEMATICS INVITATIONAL

英文姓名 /Nama/Name		班级 /Kelas/Class	
学校名称 /Nama Sekolah /School Name			

9

2024

初中三年级 ↔ Tingkatan 3 ↔ FORM 3

1 小时

9

### ARAHAN/INSTRUCTIONS AND INFORMATION

1. 未获监考老师许可之前不可翻开此比赛试卷。  
Jangan buka kertas soalan ini sehingga diberitahu oleh cikgu.  
Do not open the booklet until told to do so by your teacher.
2. 本试卷共有 30 题。  
Kertas soalan ini mengandungi 30 soalan.  
This question paper consists of 30 questions.
3. 题目所提供之图形只是示意图，不一定精准。  
Rajah yang mengiringi soalan tidak dilukiskan mengikut skala kecuali dinyatakan.  
Diagrams are NOT drawn to scale. They are intended only as aids.
4. 不准使用数学表或计算器。  
Tidak dibenarkan menggunakan jadual matematik atau kalkulator.  
Neither mathematical tables nor calculators may be used.
5. 答案请填写在所提供的答案卡上，将您认为正确的圆圈涂满（不是在题本上）。  
Catat jawapan dalam kad jawapan yang diberikan, dengkan sepenuhnya mewarna lingkaran yang sepadan(bukan dalam kertas soalan).  
Record your answers on the answer card provided, by fully colouring the circle matching your answer (not on the question paper).
6. 只有正确的答案才能得分。  
Markah diberikan untuk jawapan yang betul sahaja.  
Marks are awarded for correct answers only.
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## 1~10 题, 每题 3 分

Soalan 1~10, setiap soalan 3 markah  
Questions 1~10. Each question 3 marks

1. 已知  $a, b, c, d$  是不同的整数, 且  $(a+1)(b+1)(c+1)(d+1) = 121$ , 求  $a+b+c+d$ 。

Diberi  $a, b, c, d$  adalah nombor bulat yang tidak sama, dan  $(a+1)(b+1)(c+1)(d+1) = 121$ .  
Cari nilai  $a+b+c+d$ .

Given that  $a, b, c, d$  are different integers, and  $(a+1)(b+1)(c+1)(d+1) = 121$ . Find the value of  $a+b+c+d$ .

- (A) -4                      (B) -1                      (C) 1                      (D) 4

2. 求  $1 \times 1! + 2 \times 2! + 3 \times 3! + 4 \times 4! + \dots + 100 \times 100!$  的得数的个位数。

Cari digit sa daripada hasil  $1 \times 1! + 2 \times 2! + 3 \times 3! + 4 \times 4! + \dots + 100 \times 100!$ .

Find the ones digit of the result of  $1 \times 1! + 2 \times 2! + 3 \times 3! + 4 \times 4! + \dots + 100 \times 100!$ .

- (A) 6                      (B) 7                      (C) 8                      (D) 9

3. 已知  $x^2 + x + 1 = 0$ , 求  $x^4 + x^2 + 1$  的值。

Diberi  $x^2 + x + 1 = 0$ , cari nilai  $x^4 + x^2 + 1$ .

Given that  $x^2 + x + 1 = 0$ , find the value of  $x^4 + x^2 + 1$ .

- (A) 0                      (B) 1                      (C) 2                      (D) 3

$$4. \quad 1 - \frac{1}{1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{2}}}}}}}} =$$

(A)  $\frac{8}{21}$

(B)  $\frac{1}{21}$

(C)  $\frac{1}{24}$

(D)  $\frac{9}{24}$

$$5. \quad \text{若 } \frac{x^2-1}{x-1} = 0, \text{ 则 } x = ?$$

$$\text{Jika } \frac{x^2-1}{x-1} = 0, \text{ maka } x = ?$$

$$\text{If } \frac{x^2-1}{x-1} = 0, \text{ then } x = ?$$

(A) 1

(B) 0

(C) -1

(D) -2

$$6. \quad \frac{1}{3 \times 9} + \frac{1}{9 \times 15} + \frac{1}{15 \times 21} + \frac{1}{21 \times 27} + \frac{1}{27 \times 33} + \frac{1}{33 \times 39} =$$

(A)  $\frac{2}{39}$

(B)  $\frac{3}{39}$

(C)  $\frac{1}{3}$

(D)  $\frac{1}{63}$

7.  $\left(\frac{1}{14} + \frac{1}{24} + \frac{1}{34} + \frac{1}{44}\right) \times \left(\frac{1}{24} + \frac{1}{34} + \frac{1}{44} + \frac{1}{54}\right) - \left(\frac{1}{14} + \frac{1}{24} + \frac{1}{34} + \frac{1}{44} + \frac{1}{54}\right) \times \left(\frac{1}{24} + \frac{1}{34} + \frac{1}{44}\right) =$

(A)  $\frac{1}{256}$                       (B)  $\frac{1}{456}$                       (C)  $\frac{1}{756}$                       (D)  $\frac{1}{956}$

8. 将浓度为 20% 的盐水与浓度为 5% 的盐水混合，配成浓度为 15% 的盐水 600 克，需要浓度为 20% 的盐水多少克？浓度为 5% 的盐水多少克？

Untuk mendapatkan 600 g air garam dengan kepekatan 15% dengan mencampurkan air garam dengan kepekatan 20% dan 5%. Berapakah gram air garam dengan kepekatan 20% diperlukan? Berapah gram air garam dengan kepekatan 5% diperlukan?

To mix 600 g of saltwater with a concentration of 15% by mixing saltwater with concentrations of 20% and 5%. How many grams of saltwater with a concentration of 20% are needed? How many grams of saltwater with a concentration of 5% are needed?

- (A) 浓度 20% 的盐水 = 500g, 浓度 5% 的盐水 = 100 g  
Air garam dengan kepekatan 20% = 500g, air garam dengan kepekatan 5% = 100g  
Saltwater with concentration of 20% = 500g, Saltwater with concentration of 5% = 100g
- (B) 浓度 20% 的盐水 = 400g, 浓度 5% 的盐水 = 200 g  
Air garam dengan kepekatan 20% = 400g, air garam dengan kepekatan 5% = 200g  
Saltwater with concentration of 20% = 400g, Saltwater with concentration of 5% = 200g
- (C) 浓度 20% 的盐水 = 300g, 浓度 5% 的盐水 = 300 g  
Air garam dengan kepekatan 20% = 300g, air garam dengan kepekatan 5% = 300g  
Saltwater with concentration of 20% = 300g, Saltwater with concentration of 5% = 300g
- (D) 浓度 20% 的盐水 = 200g, 浓度 5% 的盐水 = 400 g  
Air garam dengan kepekatan 20% = 200g, air garam dengan kepekatan 5% = 400g  
Saltwater with concentration of 20% = 200g, Saltwater with concentration of 5% = 400g

9. 已知  $|a - b + 17| + (a + b - 23)^2 = 0$ , 求  $a^2 - b^2$  的值。

Diberikan  $|a - b + 17| + (a + b - 23)^2 = 0$ . Cari nilai  $a^2 - b^2$ .

Given  $|a - b + 17| + (a + b - 23)^2 = 0$ . Find the value of  $a^2 - b^2$ .

- (A) 391                      (B) 40                      (C) -40                      (D) -391

10. 已知  $x + 5y + 3z = 15$ ,  $2x + 8y + 5z = 35$ , 求  $x + y + z$  的平方根。

Diberikan  $x + 5y + 3z = 15$ ,  $2x + 8y + 5z = 35$ . Cari nilai punca kuasa dua bagi  $x + y + z$ .

Given that  $x + 5y + 3z = 15$ ,  $2x + 8y + 5z = 35$ . Find the square root of  $x + y + z$ .

- (A)  $\pm 1$                       (B)  $\pm 2$                       (C)  $\pm 3$                       (D)  $\pm 5$

11~20 题, 每题 4 分

Soalan 11~20, setiap soalan 4 markah

Questions 11~20. Each question 4 marks

11. 化简:

Mudahkan:

Simplify:

$$\sqrt{19 + 2\sqrt{90}}$$

- (A)  $\sqrt{10} - \sqrt{19}$       (B)  $\sqrt{10} + \sqrt{19}$       (C)  $\sqrt{10} - \sqrt{9}$       (D)  $\sqrt{10} + \sqrt{9}$

12. 若  $3^m + 3^m + 3^m = \frac{1}{3}$ , 求  $m$  的值。

Jika  $3^m + 3^m + 3^m = \frac{1}{3}$ , cari nilai  $m$ .

If  $3^m + 3^m + 3^m = \frac{1}{3}$ , Find the value of  $m$ .

- (A) -2                      (B) -1                      (C) 1                      (D) 2

13. 当  $m$ 、 $n$  都是大于 1 的整数时,  $m^4 + 4n^4$  一定是\_\_\_\_\_。

Apabila  $m$  dan  $n$  kedua-duanya adalah nombor bulat yang lebih besar daripada 1,  $m^4 + 4n^4$  pastinya \_\_\_\_\_.

When  $m$  and  $n$  are both integers greater than 1,  $m^4 + 4n^4$  is definitely \_\_\_\_\_.

- |  |   |
|--|---|
| (A) 奇数<br>Nombor ganjil<br>Odd Number    | (B) 偶数<br>Nombor genap<br>Even number         |
| (C) 质数<br>Nombor perdana<br>Prime number | (D) 合数<br>Nombor komposit<br>Composite number |

14. 下列哪一项是  $(x^2 + x + 1)(x^2 + x + 2) - 12$  的因式?

Antara pilihan di bawah, yang manakah adalah factor bagi  $(x^2 + x + 1)(x^2 + x + 2) - 12$ ?

Which of the following is a factor of  $(x^2 + x + 1)(x^2 + x + 2) - 12$ ?

- (A)  $x + 1$                       (B)  $x - 2$                       (C)  $x^2 + x + 5$                       (D)  $x^2 - x - 5$

15.  $2024 \times \left(1 + \frac{1}{2}\right) \times \left(1 + \frac{1}{3}\right) \times \dots \times \left(1 + \frac{1}{2024}\right) =$

- (A) 2046264      (B) 2047276      (C) 2048288      (D) 2049300

16.  $A + B + C = 2$

$B + C + D = 3$

$C + D + A = 4$

$D + A + B = 6$

下列哪一项是正确的?

Yang manakah adalah betul?

Which of the following is correct?

(A)  $A = 1, B = 2, C = 3, D = -1$

(B)  $A = 2, B = 1, C = 4, D = 3$

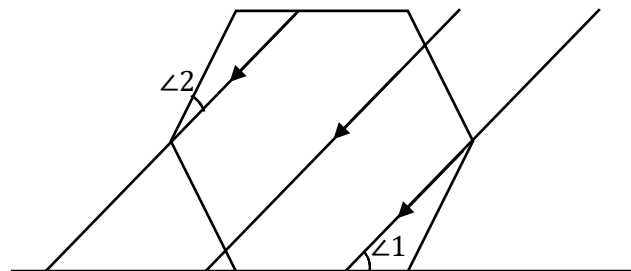
(C)  $A = 2, B = 1, C = -1, D = 3$

(D)  $A = 2, B = 1, C = 3, D = -1$

17. 下图是一个正六边形，若  $\angle 1 = 45^\circ$ ，则  $\angle 2 = ?$

Gambar berikut adalah heksagon yang beraturan, jika  $\angle 1 = 45^\circ$ ,  $\angle 2 = ?$

The figure below is a regular hexagon, if  $\angle 1 = 45^\circ$ , then  $\angle 2 = ?$



(A)  $15^\circ$

(B)  $20^\circ$

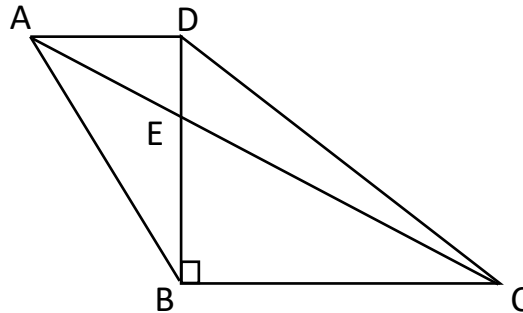
(C)  $30^\circ$

(D)  $45^\circ$

18. 下图中,  $AD \parallel BC$ ,  $AD = 18$ ,  $BD = 24$ ,  $BE = 2DE$ , 求  $BC$  的长度。

Dalam gambar,  $AD \parallel BC$ ,  $AD = 18$ ,  $BD = 24$ ,  $BE = 2DE$ , cari panjang  $BC$ .

In the figure,  $AD \parallel BC$ ,  $AD = 18$ ,  $BD = 24$ ,  $BE = 2DE$ , find the length of  $BC$ .



- (A) 18                      (B) 36                      (C) 54                      (D) 72

19. 三个质数的倒数和是  $\frac{36023}{56014}$ , 求这三个质数的和。

Jumlah nombor songsang tiga nombor perdana adalah  $\frac{36023}{56014}$ . Cari jumlah ketiga-tiga nombor perdana ini.

The sum of the inverse of three prime number is  $\frac{36023}{56014}$ . Find the sum of these three prime numbers.

- (A) 4008                      (B) 4009                      (C) 4010                      (D) 4012

20. 求  $2x^2 + 6xy + 10y^2 + 6x - 2y - 5$  的最小值。

Cari nilai terkecil untuk  $2x^2 + 6xy + 10y^2 + 6x - 2y - 5$ .

Find the minimum value of  $2x^2 + 6xy + 10y^2 + 6x - 2y - 5$ .

- (A) -20                      (B) -15                      (C) -10                      (D) -5



21~30 题, 每题 5 分

Soalan 21~30, setiap soalan 5 markah  
 Questions 21~30. Each question 5 marks

$$21. \frac{1}{1 - \frac{1}{2} - \frac{1}{4} - \frac{1}{8} - \frac{1}{16} - \frac{1}{32} - \frac{1}{64} - \frac{1}{128} - \frac{1}{256} - \frac{1}{512} - \frac{1}{1024} - \frac{1}{2048}} =$$

$$22. 3^{2024} - 5 \times 3^{2023} + 6 \times 3^{2022} = ?$$

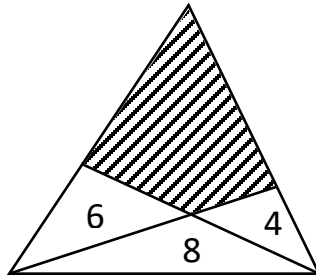
$$23. \frac{2024^2 + 2026^2}{2025^2 + 1} =$$

$$24. \frac{43.49^3 - 35.51^3}{7.98} + 43.49 \times 35.51 = ?$$

25. 求阴影部分面积。

Cari luas kawasan yang berlorek.

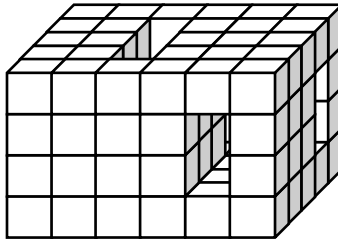
Find the area of the shaded part.



26. 有一个“空心”的长方体，空心部分相对的两个面是通的，这个“空心”的长方体是由多少个小积木所组成？

Sebuah kuboid yang “berongga”, dengan muka berongga yang berlawanan bersambung. Berapa banyak blok kecil yang membentuk kuboid yang “berongga” ini?

There is a “hollow” cuboid, with opposite faces of the hollow part being connected. How many small blocks builds this “hollow” cuboid?



$$27. \frac{x+2025}{x+2024} + \frac{x+2027}{x+2026} = \frac{x+2028}{x+2027} + \frac{x+2024}{x+2023}$$

求 $|x + 1|$ 的值。

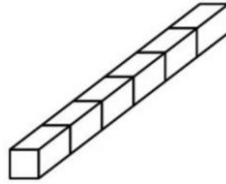
Cari nilai  $|x + 1|$ .

Find the value of  $|x + 1|$ .

28. 如图，将一个长方体的木条平均截成 6 段，每段长 1 m，表面积增加了  $150 \text{ cm}^2$ 。问这根木条原来体积是多少  $\text{cm}^3$ ？

Dalam gambar, satu kayu kuboid dibahagi kepada 6 segmen dengan setiap segmen panjangnya 1 m, luas permukaan meningkat sebanyak  $150 \text{ cm}^2$ . Apakah isipadu asal kayu kuboid ini dalam  $\text{cm}^3$ ?

As figure, a cuboid wooden strip is evenly cut into 6 segments, each 1 m long, the surface area is increased by  $150 \text{ cm}^2$ . What was the original volume of this wooden strip in  $\text{cm}^3$ ?



29. 已知  $\frac{12x+5}{2x^2-7x-15} = \frac{A}{2x+3} + \frac{B}{x-5}$ ，其中  $A$ 、 $B$  为常数，求  $8A - 3B$  的值。

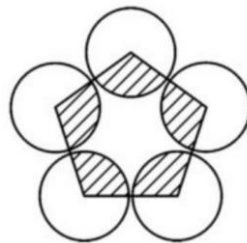
Diberikan  $\frac{12x+5}{2x^2-7x-15} = \frac{A}{2x+3} + \frac{B}{x-5}$ ,  $A$  dan  $B$  adalah nilai malar, cari nilai bagi  $8A - 3B$ .

Given that  $\frac{12x+5}{2x^2-7x-15} = \frac{A}{2x+3} + \frac{B}{x-5}$ , where  $A$  and  $B$  are constants, find the value of  $8A - 3B$ .

30. 五个相同的圆的圆心连线构成一个边长为 12 的正五边形。求阴影部分的面积。（取  $\pi = 3.14$ ）

Sambungkan pusat-pusat lima bulatan yang sama, membentuk sisi pentagon yang beraturan dengan panjang sisinya 12. Cari luas Kawasan yang berlorek. (Diberi bahawa  $\pi = 3.14$ )

Connect the centers of five identical circles form the sides of a regular pentagon with side length of 12. Find the area of shaded part. (Given that  $\pi = 3.14$ )



本试卷共有 12 页（包括本页）

Kertas ujian ini mempunyai 12 halaman (termasuk halaman ini)

This test paper has 12 pages (including this page)