数学花园
探秘
MATHEMATICS GARDEN

2026 Spring Cup
Mathematical Olympiad

Date: 28 February 2026

Time Given: 1 hour 30 minutes

Level: Primary 4

Name: _____

Instructions to Candidates

1. Do not open the booklet until you are told to do so.
2. Answer ALL 20 questions.
3. Write your answers in the answer sheet provided.
4. No steps are needed to justify your answers.
5. Questions 1-7 are worth 4 marks each.
6. Questions 8-14 are worth 6 marks each.
7. Questions 15-19 are worth 8 marks each.
8. Question 20 is worth 10 marks.
9. No marks will be deducted for wrong answers.
10. No marks will be given for unanswered questions.
11. No calculators or mathematical instruments are allowed.

Questions 1 to 7 are worth 4 marks each.

1. Find the value of $(9\times8\times7+6-5)\times4+3\times2\times1$.

【Answer】2026

【Solution】

$=(504+6-5)\times4+6$

$=505\times4+6$

$=2026$

2. There are several pears and several people. If each person gets 6 pears, there will be 12 left; if each person gets 7 pears, there will be 11 needed. How many people are there?

【Answer】23

【Solution】

There is a total change of $12+11=23$ from "12 left" to "11 needed".
There is an individual change of $7-6=1$ from "getting 6 pears each" to "getting 7 pears each".
Thus, number of people is $23\div1=23$.

3. Clara is 4 years older than Daisy. Clara's age in 3 years will be twice Daisy's age 1 year ago. What is Daisy's age now?

【Answer】9

【Solution】

The age difference between Clara's age in 3 years' time and Daisy's age 1 year ago is $4+3+1=8$.

From the model, 1 unit is 8. Thus, Daisy's age 1 year ago was 8. Daisy's age now is $8+1=9$.

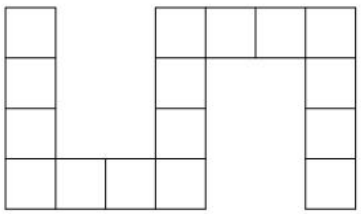
4. Two trains, A and B, are traveling towards each other from two locations 770 kilometers apart. Train A travels at 45 km/h, while Train B travels at 41 km/h. Train B departs 2 hours before Train A. How many hours after Train A departs will it meet Train B?

【Answer】8

【Solution】

Train B travels $41\times2=82$ km in the first 2 hours. After that, Train A and Train B is $770-82=688$ km apart. Time needed for the two trains to meet is $688\div(45+41)=8$ hours.

5. The figure below consists of 16 squares of equal size. If the area of this shape is 400 square centimeters, what is its perimeter in cm?

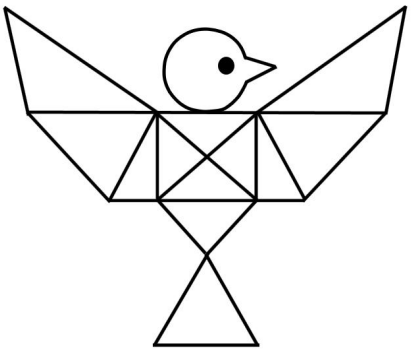


【Answer】170

【Solution】

Area of 1 small square is $400 \div 16 = 25$.
Since $25 = 5 \times 5$, 1 side of the small square is 5 cm.
The perimeter of the figure contains 34 small sides, which is $34 \times 5 = 170$ cm.

6. The figure below shows the 'Lucky Bird' design. How many triangles are there in this pattern?



【Answer】18

【Solution】

1 part: 12 triangles
2 parts: 4 triangles
3 parts: 2 triangles
Total is $12 + 4 + 2 = 18$.

7. In a class of 30 students, the average score for a Science test is 68. Two students, Daniel and Ethan, leave the class. The average score of the remaining students increases to 69. Find the average score of Daniel and Ethan?

【Answer】54

【Solution】

The average of the remaining 28 students is $69 - 68 = 1$ mark higher than the average of the whole class. In total, these 28 students are $28 \times 1 = 28$ marks higher than the average. This means the total of Daniel and Ethan is 28 marks lower than the average. Thus, each of them is $28 \div 2 = 14$ marks lower than the new average. The average of Daniel and Ethan is $68 - 14 = 54$.

Questions 8 to 14 are worth 6 marks each.

8. 44 students went on a trip. They rented 10 boats in total, consisting of large boats with 5 seats and small boats with 4 seats, all fully occupied. They need to calculate the total cost for renting these boats. A large boat costs \$30 and a small boat costs \$25. How much would it cost in total?

【Answer】\$270

【Solution】

Assume all are boats with 4 seats.

$10 \times 4 = 40$

$44 - 40 = 4$

$4 \div (5 - 4) = 4$ boats with 5 seats

$10 - 4 = 6$ boats with 4 seats

Total cost is $4 \times 30 + 6 \times 25 = \$270$.

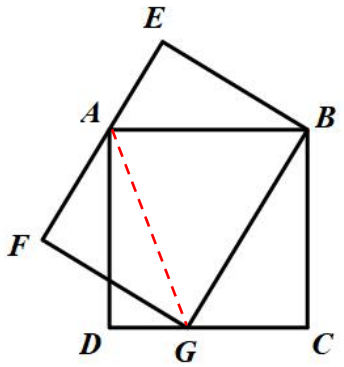
9. Suppose a bag contains 4 red balls, 5 pink balls, 7 yellow balls, and 8 black balls. To ensure that at least 3 different colors are drawn, what is the minimum number of balls needed to draw?

【Answer】16

【Solution】

Consider the worst-case scenario where everything of 1 color is drawn before a different color is drawn. The worst case is when we start from the color with the greatest number of balls. We choose 8 black and 7 yellow and 1 more ball of any color. Total is $8 + 7 + 1 = 16$.

10. As shown in the figure, the square ABCD has a side length of 8 cm, and the rectangle EBGF has a length of 10 cm. What is the width of the rectangle?



【Answer】6.4 cm

【Solution】

Connect AG.

Using half model, we have $\triangle ABG = \frac{1}{2} ABCD$, $\triangle ABG = \frac{1}{2} BEFG$.

Thus, $ABCD = BEFG = 8 \times 8 = 64$.

Width is $64 \div 10 = 6.4$ cm.

11. In the calendar of a certain month, there are more Fridays than Tuesdays and more Wednesdays than Saturdays. On which day is the 15^{th} day of the month?

【Answer】Wednesday

【Solution】

In a 31-day month, three consecutive weekdays occur 5 times, while the others occur 4 times. Since there are more Fridays than Tuesdays and more Wednesdays than Saturdays, both Friday and Wednesday must be among the days that occur 5 times. This means the month has 31 days.

The only three consecutive weekdays that include both Wednesday and Friday are Wednesday, Thursday and Friday. Therefore, the 1st day of the month must be Wednesday.

Since 14 days make exactly two weeks, the 15th day falls on the same weekday as the 1st day. Hence, the 15th day of the month is **Wednesday**.

12. A workshop needs to process 3960 parts. Three workers completed 1320 parts in 10 hours, with the remaining parts to be finished within 15 hours. Assume all workers work at the Same rate, how many additional workers are required?

【Answer】1

【Solution】

1 worker can complete $1320 \div 10 \div 3 = 44$ parts in 1 hour.
Remaining parts must be completed at the rate of $(3960 - 1320) \div 15 = 176$ parts per hour.
Thus, $176 \div 44 = 4$ workers are required for the remaining work.
$4 - 3 = 1$ additional worker is needed.

13. A and B are two prime numbers. Given that $A \times 5 + B \times 7 = 409$, find the value of $A + B$.

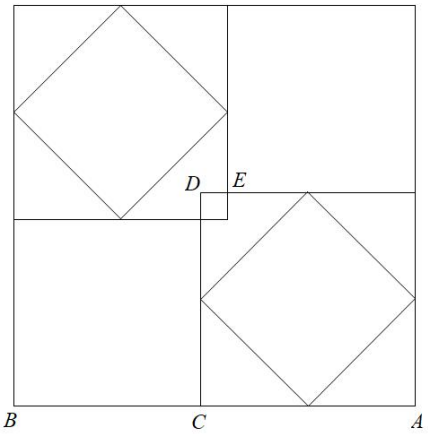
【Answer】81

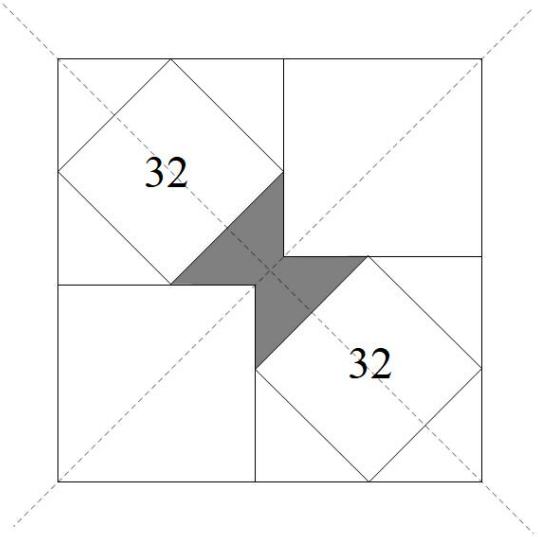
【Solution】

To get a sum of an odd number 409, it can be “even + odd” or “odd + even”. To get a product of even number, the prime number has to be 2. Let’s discuss in 2 cases.
Case 1: If $A = 2$, then $2 \times 5 + B \times 7 = 409$.
$B \times 7 = 409 - 10 = 399$
$B = 399 \div 7 = 57$
This is wrong because 57 is not prime.

Case 2: If $B = 2$, then $A \times 5 + 2 \times 7 = 409$.
$A \times 5 = 409 - 14 = 395$
$A = 395 \div 5 = 79$
79 is prime, which satisfies the condition. $A + B = 79 + 2 = 81$.

14. As shown in the figure, in a square with an area of 225, place four small squares to form a symmetrical figure with two lines of symmetry. Two squares with an area of 32 are marked and the other 2 square are also the same. Find the area of the shaded region.





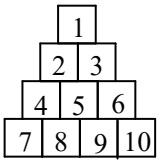
【Answer】15

【Solution】

According to the question, $AB = 15$, $AC = 8$, so $BC = 15 - 8 = 7$, $DE = 8 - 7 = 1$. The shaded area is covered by two overlapping isosceles right triangles, and its area is $32 \div 2 - 1 = 15$.

Questions 15 to 19 are worth 8 marks each.

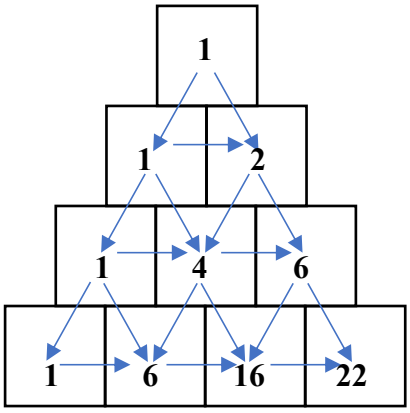
15. The diagram shows 10 numbered rooms. You can move from a smaller-number room to an adjacent larger-number room, but not the other way around. How many distinct paths are there from room 1 to room 10(not necessary to pass through all room)?



【Answer】22

【Solution】

The number of ways to reach a point is equal to the sum of the numbers of ways to reach all the points that are one step before it. By the labelling method, we can find that there is a total of 22 ways.



16. As shown in the figure below, A~G represent the digit 1~7, the same letter represent the same digit, different letter represent different digits. Find the 4-digit number "$\overline{ABCD}$".

$$\begin{array}{cccc} & & A & B \\ & \times & C & D \\ \hline & F & C & D \\ E & A & E & \\ \hline E & G & A & D \end{array}$$

【Answer】4735

【Solution】

The puzzle contains 7 different characters, meaning the digits 1 through 7 each appear exactly once. By analyzing the positions of the letters *A*, *B*, *C*, *D*, and *E*, we can determine that none of them can be 1, and *A* must be at least 3.
The digit *D* can only be 2, 4, or 5.
If *D* were 2 or 4, then *B* would be 6, but the first partial product $\overline{FCD}$ would have no solution that fits the requirements. Therefore, *D* must be 5.
If *F* were 1, then *A* would be 3. However, this would force *B* to be 7, which does not satisfy the requirements.
Thus, *E* must be 1.
With *E* = 1, the digits for *C* and *D* are 3 and 7. Since *A* must be at least 3, we can deduce the following: *C* = 3 and *B* = 7
By following the multiplication through, we find *A* = 4.
By substituting these values, we find that the 4-digit number $\overline{ABCD}$ is 4735.

17. Alex write a sequence with 2 pattern as below, he can write any one pattern randomly, but he must finish writing before modifying the next pattern.
    (i) AAABAAC
    (ii) AABBACC
    After he finished a whole number of patterns, he find there are 125 "A"s and 46 "B"s. Find the number of complete pattern of (i).

【Answer】16

【Solution】

From the pattern (i) and (ii), we can find that the number of B and C are equal in each pattern.
So there must be also 46 "C"s.
There are $125+46+46=217$ letters in total.
So $217\div 7=31$ groups
If all the 31 groups are Pattern (i), there will be 31 "B"s.
There are $46-31=15$ letters "B"s more than 31.
Changing each pattern (i) to (ii), there will be 1 letter "B" added.
So we need $15\div 1=15$ groups (ii).
There will be $31-15=16$ groups of pattern (i).

18. There are 12 lamps, each with one of three colors: red, yellow, or green. Allen, Benjamin, Cindy, and Daniel don't know the actual lighting status. The table below summarizes their color guesses for each lamp and the number of correct guesses:

number	1	2	3	4	5	6	7	8	9	10	11	12	correct guesses
Allen	Y	R	Y	G	R	R	G	Y	G	G	Y	R	6
Benjamin	Y	G	G	R	G	Y	Y	G	R	Y	R	Y	7
Cindy	R	G	Y	R	G	G	Y	Y	R	R	Y	Y	9
Daniel	G	Y	R	R	Y	R	R	G	R	Y	G	G	

Y - Yellow, R - Red, G - Green

Find the number of correct guesses of Daniel.

【Answer】3

【Solution】

Benjamin and Cindy gave identical guesses for lamps 2, 4, 5, 7, 9, and 12.
(1) If 5 out of 6 common answers is correct,
Since Allen's answers for these 6 lamps are all different from Benjamin's and Cindy's, this means that Allen has at least 5 wrong answers from lamps 2, 4, 5, 7, 9, and 12.

As for the remaining lamps 1, 3, 6, 8, 10, 11, Benjamin guessed $7-5=2$ correctly; Cindy guessed $9-5=4$ correctly. This means that either Benjamin or Cindy is correct.

Since Allen's answers for lamps 6 and 10 are different from both Benjamin's and Cindy's answers, this means Allen guessed lamps 6 and 10 wrongly.

Altogether, Allen has at least $5+2=7$ wrong guesses, which is impossible because he has 6 correct guesses.

(2) This means that these 6 lamps must all be correct for both of them.

Allen's guesses for those same six lamps (2, 4, 5, 7, 9, and 12) are all different from the correct colors identified above. This means Allen got 0 correct in that group.

Since Allen has a total of 6 correct guesses, he must have guessed all the other lamps (1, 3, 6, 8, 10, and 11) correctly.
By combining these findings, the actual colors of lamps 1-12 are: Yellow, Green, Yellow, Red, Green, Red, Yellow, Yellow, Red, Green, Yellow, Yellow.

Comparing Daniel's guesses to this sequence:

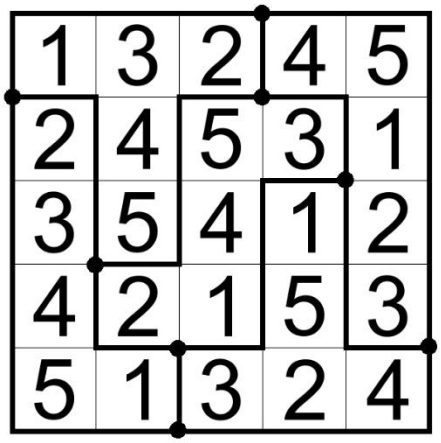
Lamp 4 (Red): Correct

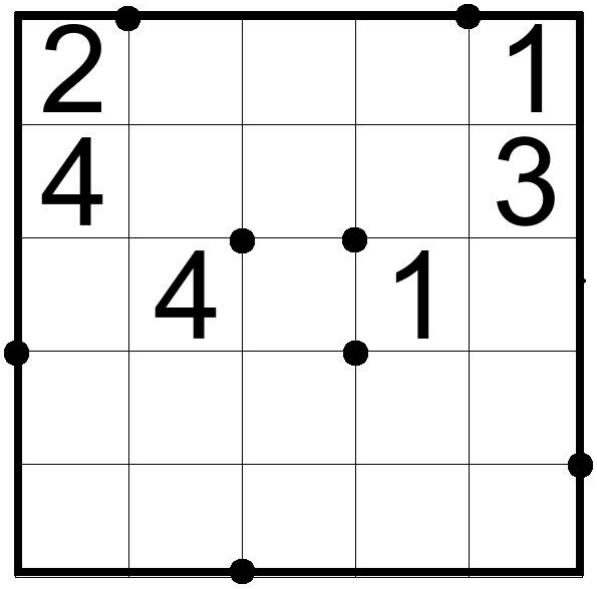
Lamp 6 (Red): Correct

Lamp 9 (Red): Correct

Daniel made 3 correct guesses.

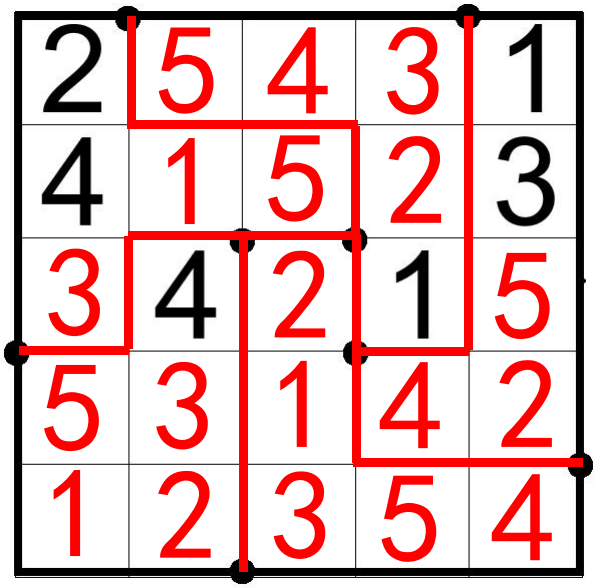
19. The figure below presents an irregular Sudoku puzzle, requiring each row, column, and irregular cell enclosed by thick lines to contain exactly one digit from 1 to 5. The black dots indicate all intersections within the grid where three thick lines intersect. In the lower right version, the thick lines between cells are omitted, but all black dots are clearly marked. Find the 5-digit number formed by the digits in the fifth row, arranged from left to right.





【Answer】12354

【Solution】



Question 20 is worth 10 marks.

20. In your opinion, from question 1 to 19, your favourite question is question _____ and the most difficult question is question _____.

(As long as your answer is within 1 to 19, you get full marks, otherwise you get zero.)