数学花园
探秘
MATHEMATICS GARDEN

2026 Spring Cup
Mathematical Olympiad

Date: 28 February 2026

Time Given: 1 hour

Level: Primary 3

Name: _____

Instruction to Candidates

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

Questions 1 to 7 are worth 4 marks each.

1. Fill in the blank.

$2026 = 7 \times 11 \times 13 \times 2 + (\quad)$

$7 \times 11 = 77$
$13 \times 2 = 26$
$77 \times 26 = 2002$
$2026 - 2002 = 24$

2. Add "( )" to make the equation correct.

$1 + 4 \times 9 - 2 = 29$

$1 + 4 \times (9 - 2) = 29.$

3. 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?

Case 1: 6 6 . . . 6 12 left

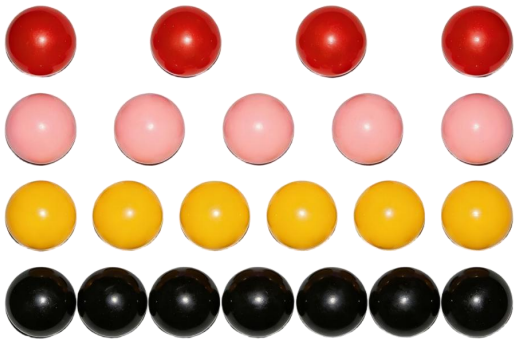
Case 2: 7 7 . . . 7 11 needed.

Total EXTRA pears given to ALL people from 1 to 2 = 12 + 11 = 23.
Total EXTRA pears given to EACH person from 1 to 2 = 7 – 6 = 1

Total Extra pears given to ALL ÷ Total EXTRA pears given to EACH person = Total number of people

23 ÷ 1 = 23 people.

4. Suppose a bag contains 4 red balls, 5 pink balls, 6 yellow balls, and 7 black balls. To ensure that at least 3 different colors are taken, what is the minimum number of balls needed to take?



To ENSURE we take at least 3 different colours, we need to consider the WORST CASE.

Take all 7 black balls, take all 6 yellow balls, then take 1 either red or pink ball. Hence,

$7 + 6 + 1 = 14$ balls minimum to take at least 3 different colours.

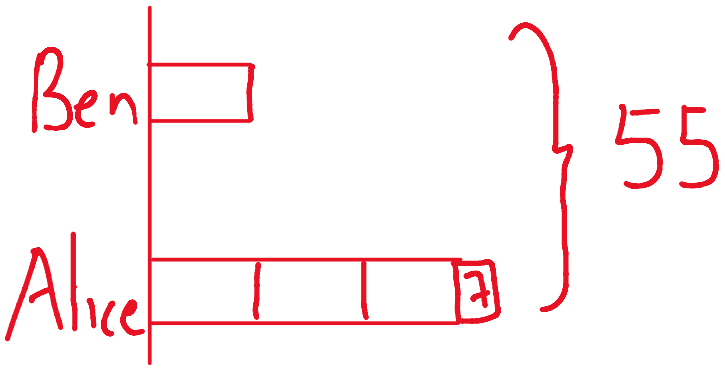
5. Cindy was born in June 2016. When she is 49 months old, what year and month will it be?

How many years is 49 months later: $49 \div 12 = 4$ years Remainder 1 month

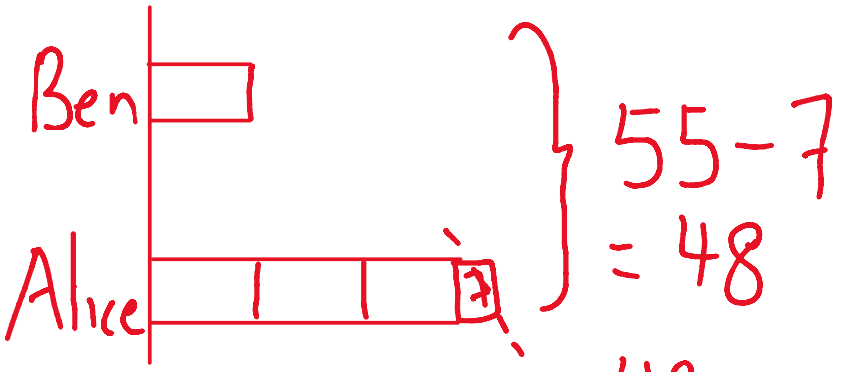
June 2016 add 4 years and 1 month will be **July 2020.**

6. At a school book fair, Alice and Ben bought some stickers. Alice bought 7 more stickers than 3 times the number of stickers Ben bought. Altogether, they bought 55 stickers. How many stickers did Ben buy?

There is 7 more than 3 times, a multiple relationship, so we DRAW MODEL.



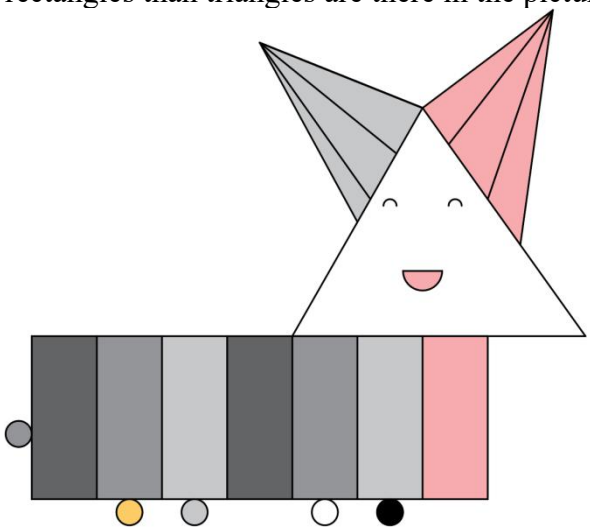
Make them whole units:



4 units : 48

Ben : 1 unit : 48 ÷ 4 = 12 stickers

7. How many more rectangles than triangles are there in the picture?



Rectangles: 7 single rectangles, 6 rectangles of 2 single rectangles combined together, 5 rectangles of 3 single rectangles combined together, …, 1 rectangle of 7 single rectangles combined together. Hence,

$$\text{Number of rectangles} = 7 + 6 + 5 + 4 + 3 + 2 + 1 = 28$$

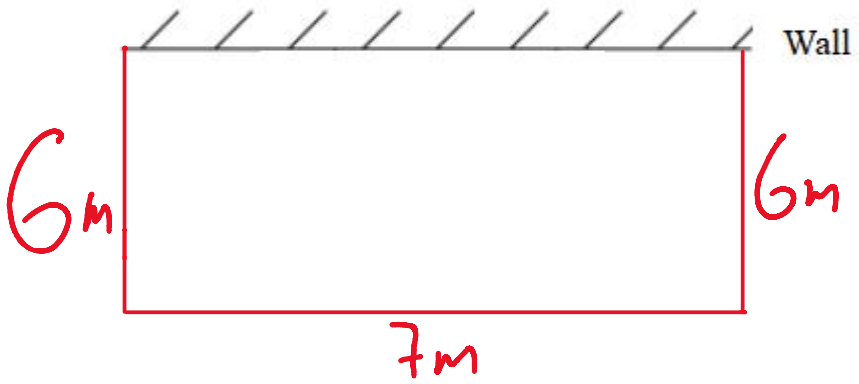
Similarly for triangles,

$$\text{Number of triangles} = (3 + 2 + 1) \times 2 + 1 = 13$$

$$28 - 13 = 15 \text{ more rectangles than triangles.}$$

Questions 8 to 14 are worth 6 marks each.

8. Grandpa plans to enclose a rectangular vegetable garden in his backyard with wooden boards (as shown in the diagram). **One side of the garden is against a wall.** The garden is 7 meters long and 6 meters wide. What is the minimum total length of wooden boards he needs?



Minimum total length of woodboards = 6 + 6 + 7 = 19m

9. The four letters below represent the numbers 2, 3, 5, and 9. The same letter represents the same number. Find the value of "M".($\overline{SS}$ represents a two-digit number.)

$$S + C + C + M + O + O = \overline{SS}$$

$$S + C + C + M + O + O = \overline{SS}$$

Highlighted in red adds up to 19 (2 + 3 + 5 + 9).

$$C + O = \overline{SS}$$

SS cant be 55 and 99. It cant be 22 too since 2 + 3 = 5, 19 + 5 = 24. So, SS can only be 33.
Thus, C and O will be 5 and 9, S is 3.
Hence, M is 2.

10. A school is preparing gift packs for a charity event. Each gift pack contains only notebooks and pens. For every 2 notebooks, there are 3 pens. Altogether, there are 190 items in all the gift packs. How many notebooks are there?

Group 2 notebooks and 3 pens together. In one group, there are 5 items.

Find how many such groups:

190 ÷ 5 = 38 groups.

In one group, there is 2 notebooks. Hence,

Number of notebooks = 38 × 2 = 76.

11. Captain America has 4 shields, among which 2 are fake. The fake shields look and feel exactly the same as the real ones, but they are lighter. He has only a balance scale and no weights. What is the minimum number of weighings needed to guarantee finding all the fake shields?

Let's name all of them A, B, C and D. First we weigh A and B together.

If A and B same weight, this means they are either both fake or both real.

Second, we weigh A with either C or D. If A is heavier, meaning A and B are real, and C and D are fake.

2 weighings.

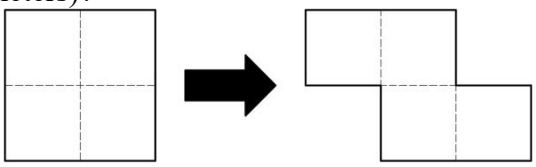
If from first weighing, A and B different weight, then we know the heavier one is real, lighter one is fake. Let's say A is heavier, hence real.

Then, we weigh A with either C or D. Let's say we weigh with C. If after weighing A is same weight as C, then we know A and C are real, B and D are fake.

If A is lighter, the same logic follows.

Hence, the answer is 2 weighing.

12. Harry cut a large square piece of paper along the dotted lines shown on the left in the diagram, obtaining four identical small square pieces. He then rearranged the four small squares into a "staircase" shape. The perimeter of the "staircase" is 6 cm longer than the perimeter of the original large square. What is the perimeter of the original large square (in centimeters)?



We count how many **sides of small square** does each perimeter of each diagram has, so for the first diagram, there is 8 small square sides. For the second diagram, there is 10 square sides.

Hence, there is 10 – 8 = 2 small square sides more. Since the perimeter of staircase is 6cm longer,

2 small square sides = 6cm
1 small square side = 3cm

Original large square has 8 small square sides, hence perimeter = 8 × 3 = 24cm

13. Sixteen people take part in a table tennis tournament using a knockout system (two people play one match, and the loser is eliminated). How many matches does the second-place play in total?(There are no ties.)

The second-place will play and win first match to be Top 8,

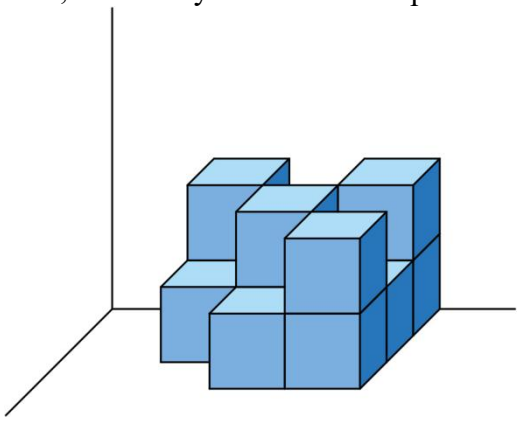
Play and win second match to be Top 4,

Play and win third match to be Top 2,

PLAY and LOSE fourth match to be second-place.

So in total, the second-place played 4 matches.

14. Amy used 12 small white cubes to build a large model and attached it to a wall (as shown in the diagram). He then painted all the exposed surfaces blue. Among all the faces of the small cubes, how many faces were not painted blue?



Total faces = 12 × 6 = 72 faces.

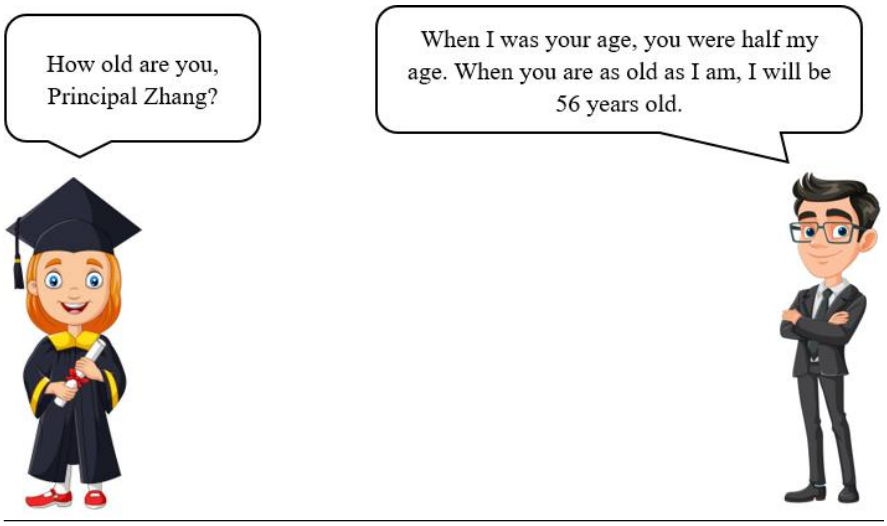
In a cube, there are 6 faces, Up, Down, Left, Right, Front, Back. We count how many faces painted for each direction.

Total faces painted = 8 (Up) + 0 (Down) + 7 (Left) + 7 (Right) + 7 (Front) + 2 (Back) = 31 faces.

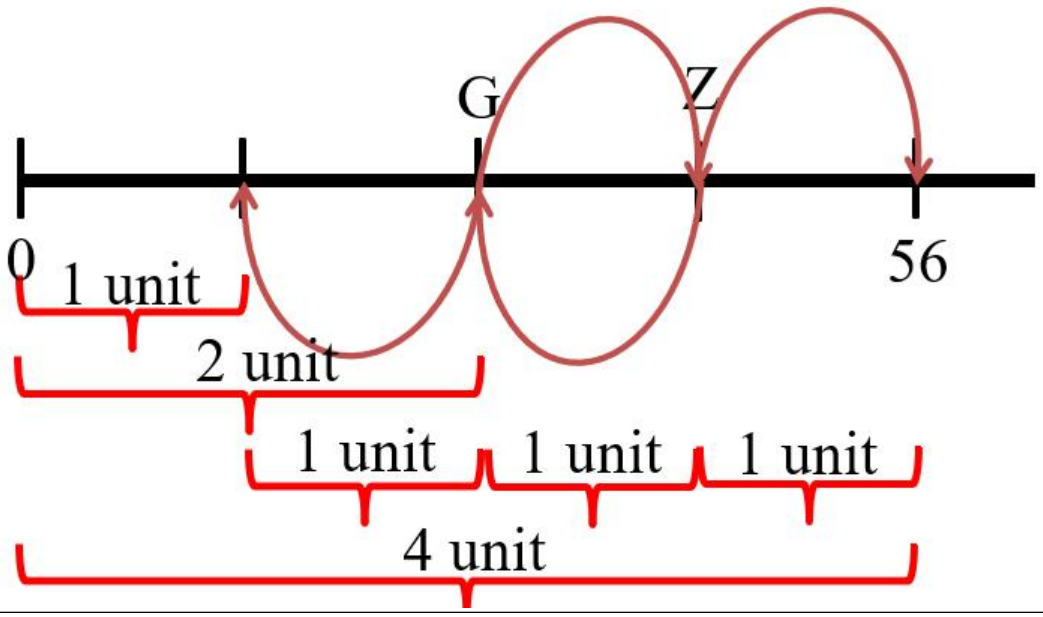
Total faces not painted = Total number of faces – faces painted = 72 – 31 = 41

Questions 15 to 19 are worth 8 marks each.

15. How old is Principal Zhang this year?



We draw Age Ruler.



The curved lines below the black line shows the changes of the first sentence, curved lines above shows the changes of the second sentence.

Key: Age Difference does not change even if some years pass or some years ago.

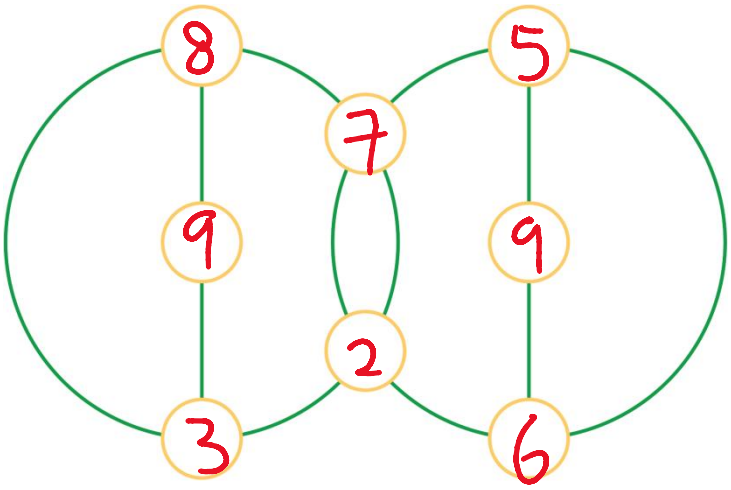
When Principal Zhang is same age as the girl, Principal Zhang's age decreases, hence the girl's age must decrease too. Principal Zhang's age is then twice that of the girl, hence Principal Zhang's decreased age is twice that of the girl's decreased age. From here, we know that the decrease in age is 1 unit. Then, after the second change, we know that Principal Zhang increase by 1 unit again to be 56 years old. Hence,

4 units: 56

1 unit: $56 \div 4 = 14$ years.

Principal Zhang's age = $56 - 14 = 42$ years old

16. Place the numbers 2, 3, 5, 6, 7, 8, 9, and 9 into the small circles shown in the diagram so that the sum of the three numbers on each straight line is 20, and the sum of the four numbers in each green circle is also 20.

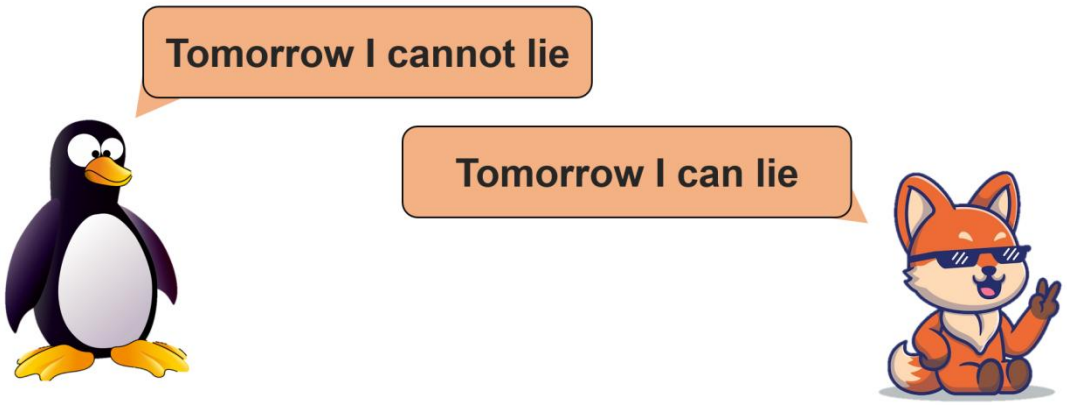


The four small circles on each big circle line has to add up to 20, and each straight line has to add up to 20. The correct answer is as above.

$8 + 9 + 3 = 20$
$8 + 7 + 2 + 3 = 20$
$5 + 9 + 6 = 20$
$5 + 7 + 2 + 6 = 20$

Note: The answer is not unique. There are different answers that are correct as well.

17. Both the animal's penguin and the fox like to lie.
Whenever they can lie, they will definitely lie.
The king therefore set a rule:
The penguin can lie only on Wednesdays, Thursdays, and Fridays;
while the fox can lie only on Fridays, Saturdays, and Sundays.
One day, a penguin met a fox.



On which day of the week did they meet?

Guess the day of the week:

On Monday, Penguin (P) must tell the truth, hence tomorrow P can't lie. P can't lie on Tuesday, so it's correct. Fox (F) must tell the truth, hence tomorrow F can lie. F can't lie on Tuesday, so it's wrong. Monday is not the day they met.

On Tuesday, Penguin (P) must tell the truth, hence tomorrow P can't lie. P can lie on Wednesday, so it's wrong, we don't need to check for F, Tuesday is not the day they met.

On Wednesday, Penguin (P) will lie (P and F will lie whenever they can). Hence tomorrow P CAN lie. P can lie on Thursday, so it's correct. Fox (F) must tell the truth on Wednesday, hence tomorrow F can lie. F can't lie on Thursday, so it's wrong. Wednesday is not the day they met.

Use the same method to check for all week to get Thursday AND Sunday.

18. A palindrome is a number that reads the same forward and backward. Examples: 33, 121, 1331
Adding a 2-digit number to its reversed 2-digit number may result in a palindrome.
For example, take 12. Its reversed number is 21, and 12 + 21 = 33, which is a palindrome.
Another example: 29 + 92 = 121, and 121 is also a palindrome.
However, 84 + 48 = 132, and 132 is not a palindrome.
How many 2-digit numbers can be added to their reversed numbers to obtain a palindrome?(Note: 12 and 21 are considered as 2cases.)

10 does not work as there is a 0 and we can't reverse it.
12 + 21 = 33 works and the 3 of the ones digit is obtained from 2+1, but
19 + 91 = 110 does not work as 9 + 1 = 10, carrying forward happens. Hence, it can only work when the digits added together does not have carrying forward.
Hence, 11, 12, 13, … 18 is correct. There are 8 cases for 11 - 19.
21, 22, 23 … 27 is correct. There are 7 cases 21 - 29 .
31, 32, 33, … 36 is correct, there are 6 cases 31 - 39.
…
71, 72 is correct, there are 2 cases for 71 - 79
81 is correct, there are 1 cases for 81 – 89.
Total = 8 + 7 + 6 + 5 + 4 + 3 + 2 + 1 = 36.

When we have two 2-digit numbers added together, we can get a 3-digit number that is below 200. _ _ + _ _ = _ _ _. Since it can't go beyond 200, _ _ + _ _ = 1_ _. To have a palindrome, the ones digit has to be 1 as well. _ _ + _ _ = 1 _ 1. The only numbers at ones digit that add together that can get 1 is only numbers that add together to be 11 (Since no 0's is allowed).
Hence, 29 + 92, 38 + 83, 47 + 74, 56 + 65 is correct. There are 8 cases here.

Total = 36 + 8 = 44.

19. In the sequence 1, 1, 2, 3, 5, 8, ..., starting from the third number, each number is the sum of the two preceding numbers. How many of the first 2000 numbers in this sequence are multiples of 3?

1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144,

Remainder when divided by 3: 1 1 2 0 2 2 1 0 1 1 2 0

Every 4 numbers, the number is divisible by 3 i.e. multiple of 3, hence, there are 2000 ÷ 4 = 500 such groups. There are 1 such number in each group, hence there are 500 numbers that are multiples of 3.

Questions 20 is worth 10 marks.

20. In your opinion, from question 1 to 19, your favourite question is question _____, the most difficult question is question _____.
(As long as your answer is within 1 to 19, you get full marks, otherwise you get zero.)