



# APSMO

2023 : DIVISION J  
FOLLOW UP QUESTIONS

OLYMPIAD

4

## Questions and Answers For teacher use only. Not for Distribution.

- 4A: Follow Up 1:**  
Using the given box; 1 decilitre of paint is needed to cover each  $1 \times 1$  square of the outside surface area of the box. How many litres of paint would be needed to paint the entire outside surface of the box?  
**5.2**
- 4A: Follow Up 2:** Another rectangular box also has a base measuring 3 by 4. Its surface area is the same as the total surface area of the box in the original problem, but this box has no cover. If the lateral faces all have the same height, what is the volume of this open box?  
**240/7 units<sup>3</sup>**
- 4B: Follow Up 1:** A car loses 20% of its value each year. A used car has a resale value of \$5120.00 after three years. What was the original value of the car?  
**\$10,000.00**
- 4B: Follow Up 2:** Riley's pal Lucas also collects bottle caps, but his collection, as of today, has 42 fewer bottle caps than Riley's collection. Lucas wants to catch up! If he can add two bottle caps per day more than Riley adds, beginning today, how many days until he catches up?  
**21**
- 4C: Follow Up 1:** The numbers 1, 5, 9, and 13 form an arithmetic progression because the difference between consecutive terms is constant – in this example the difference is 4. Find an arithmetic progression consisting of 3 integers, in which the first is 1 and the last is 2023.  
**1, 1012, 2023**
- 4C: Follow Up 2:** Find an arithmetic progression consisting of 7 integers, in which the first is 1 and the last is 2023.  
**1, 338, 675, 1012, 1349, 1686, 2023**
- 4D: Follow Up:** Bill knows Marie's secret number. When he divides her secret number by 3201, his remainder is 845. What is the remainder when he divides her number by 11?  
**9**
- 4E: Follow Up 1:** Find the passcode if (1) the first two digits are primes differing by 1 (in some order), and (2) the number formed by the last two digits is a prime less than 15, and (3) the passcode itself is prime.  
**2311**
- 4E: Follow Up 2:** A certain passcode is the product of four primes, each less than 15. If each of the primes less than 15 is equally likely to be a factor, what is the probability that the passcode is an even integer?  
 **$\frac{2}{3}$**



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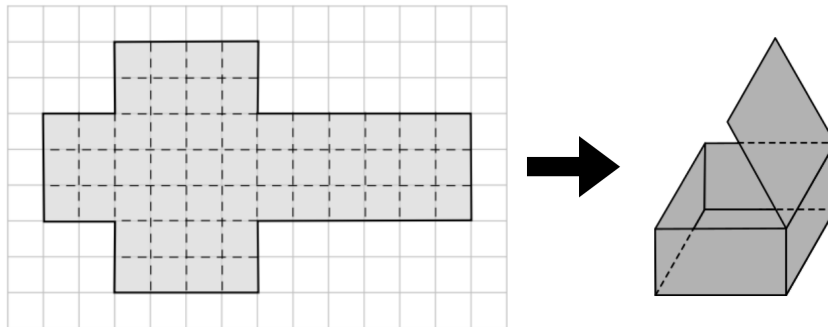
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## 4A: Follow Up 1:

Using the given box; 1 decilitre of paint is needed to cover each  $1 \times 1$  square of the outside surface area of the box. How many litres of paint would be needed to paint the entire outside surface of the box?



## Follow Up 2:

Another rectangular box also has a base measuring 3 by 4. Its surface area is the same as the total surface area of the box in the original problem, but this box has no cover.

If the lateral faces all have the same height, what is the volume of this open box?



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**4B: Follow Up 1:**

A car loses 20% of its value each year.  
A used car has a resale value of \$5120.00 after three years.  
What was the original value of the car?

**Follow Up 2:**

Riley's pal Lucas also collects bottle caps, but his collection, as of today, has 42 fewer bottle caps than Riley's collection. Lucas wants to catch up!  
If he can add two bottle caps per day more than Riley adds, beginning today, how many days until he catches up?

**Reminder:** Today Riley has 142 bottle caps and he collects 5 more bottle caps each day.



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**4C: Follow Up 1:**

The numbers 1, 5, 9, and 13 form an arithmetic progression because the difference between consecutive terms is constant – in this example the difference is 4.

Find an arithmetic progression consisting of 3 integers, in which the first is 1 and the last is 2023.

**Follow Up 2:**

Find an arithmetic progression consisting of 7 integers, in which the first is 1 and the last is 2023.

**4D: Follow Up 1:**

Bill knows Marie's secret number. When he divides her secret number by 3201, his remainder is 845.  
What is the remainder when he divides her number by 11?



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**4E:** The question was:

The secret passcode for Chloe's Club is a four-digit number.

The passcode has only two prime factors.

One of those primes is a single-digit number.

The sum of the digits of the passcode is 16.

The last three digits of the code are the same. What is the passcode? (1555)

**Follow Up 1:**

Find the passcode if:

- the first two digits are primes differing by 1 (in some order), and
- the number formed by the last two digits is a prime less than 15, and
- The passcode itself is prime.

**Follow Up 2:**

A certain passcode is the product of four primes, each less than 15.

If each of the primes less than 15 is equally likely to be a factor, what is the probability that the passcode is an even integer?