

NMOS 2023 Round 1

Time Duration: 1 hour 30 minutes Name: _____ Marks: _____

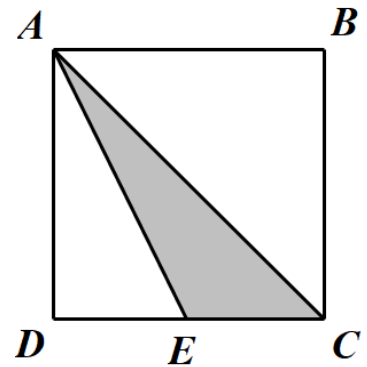
1. Evaluate $\frac{8 + (12 - 3 - 4)^2 \times 5 - 7}{9 - 6}$

2. Initially, a primary school had 250 girls and 200 boys. Last week, 15 new girls and n new boys were transferred to the school. Despite this, the ratio of girls to boys in the school remained the same. Find the value of n .

3. A jar contains some marbles, consisting of red and blue marbles. The red marbles make up 60% of the total number of marbles. If some yellow marbles are added to the jar, and the percentage of red marbles is reduced to 45%, what percentage of the final number of marbles are yellow?

4. This year, Mr. Lee is 46 years old, and his son is 16 years old. How many years ago was Mr. Lee's age 7 times that of his son?

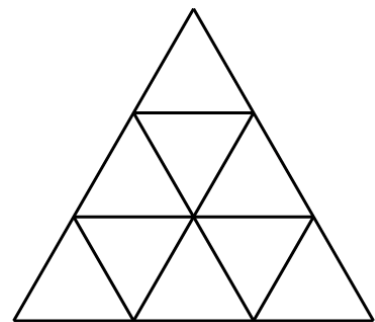
5. The figure below shows a square ABCD and E is the mid-point of CD. Given that the area of triangle ACE is 49 cm^2 . Find the perimeter (in cm) of the square ABCD.



6. In a piggy bank, there is a total amount of \$62.10 made up of 10-cent and 50-cent coins in the ratio of 2:5. What is the number of 10-cent coins in the piggy bank?

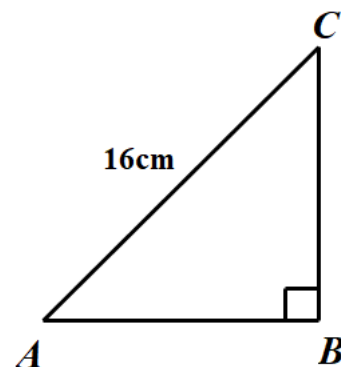
7. The average monthly salary of a team of 6 employees is \$4250. When two new employees are hired, one with a salary of \$4500 and the other with a salary of \$5000, what is the new average monthly salary, in \$, of the team?

8. What is the minimum number of matchsticks that must be removed so that there is no more equilateral triangles?

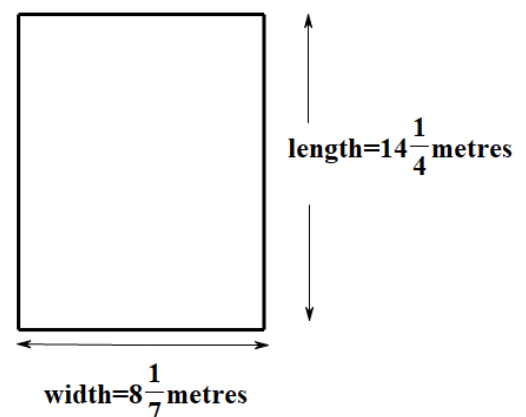


9. Mary and Alice are sisters. Mary has twice as much savings as Alice. They decide to buy a table for the bedroom they share. 10% of Mary's savings and 4% of Alice's savings are used to buy this table, which costs \$120. How much, in \$, does Mary have in savings now?

10. In the triangle ABC below, $AB = BC$, $AC = 16$ cm, and $\angle ABC = 90^\circ$ what is the area, in cm^2 , of the triangle ABC?

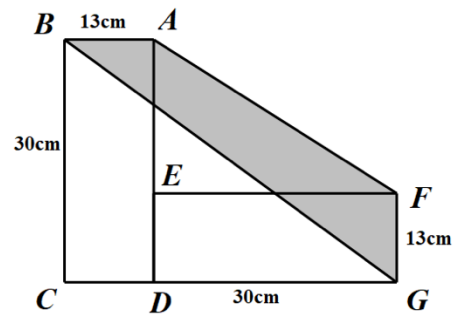


11. Mr Theodore has a small farm garden in the shape of a rectangle. The width and length of the rectangular garden is $8\frac{1}{7}$ metres and $14\frac{1}{4}$ metres, respectively. What is the area, rounded to the nearest integer, of the garden in square metres?

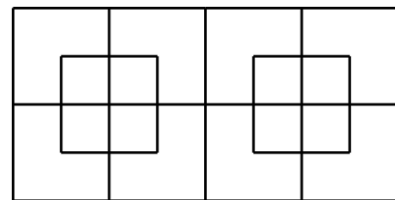


12. Mr Liew plans to distribute sweets to his students Xavier, Yew Meng and Zainiin the ratio of 3:5:6. However, he made a mistake when passing out the sweets in the three students ended up receiving the sweets in the ratio 2:3:5 instead. If one of the students received 10 more sweets than planned, how many sweets did Xavier receive from Mr Liew?

13. In the diagram below, both rectangles ABCD and DEFG are of the same length and width, i.e. 30 cm and 13 cm respectively. Find the area, in cm^2 ? of the shaded regions ABGF.



14. How many squares are there in the following figure.



15. John drove his car from his home to his friend's house at an average speed of 90 kilometers per hour. On his return journey from his friend's house back to his own house, the car's average speed was 60 kilometers per hour due to traffic congestion. As a result, John's return journey took two more hours than his initial journey to his friend's house. How many hours did the entire journey take?

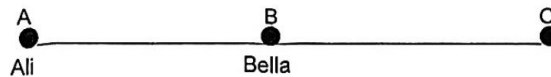
16. Ahmad has a number of 5-cent coins, 10-cent coins and 20-cent coins. If 40% of the total number of coins are 5-cent coins, and 40% of the total number of coins are 10-cent coins, what percentage of the total amount of money is made up of 5-cent coins?

17. In a certain month, three of the Mondays fall on dates that are prime numbers. What day of the week is the first day of the month?

(A prime number is a positive integer greater than 1 that has no positive integer divisors other than 1 and itself. Examples: 2, 3, 5, 7, 11...)

[If your answer is Monday, then shade your answer as "1";
If your answer is Tuesday, then shade your answer as "2";
If your answer is Wednesday, then shade your answer as "3";
If your answer is Thursday, then shade your answer as "4";
If your answer is Friday, then shade your answer as "5";
If your answer is Saturday, then shade your answer as "6";
If your answer is Sunday, then shade your answer as "7"]

18. The ratio of the speed of Ali and Bella is 13:11. If Ali and Bella start to walk towards each other from A and B respectively (in a straight line), they will meet after 30 minutes. If they were to start from A and B respectively at the same time, going towards C, find the time taken, in minutes, for Ali to catch up with Bella.



19. How many different 3-digit even numbers can be formed using the digits 2, 5, 6, 7 and 9, without repetition?

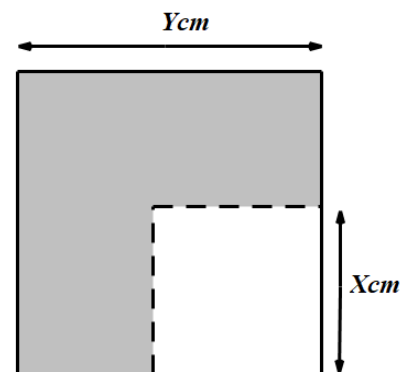
20. Four monkeys named P, Q, R and S were eating bananas at their own pace and with their own strategies. Although P was determined to finish quickly, it was not the fastest eater among the group. Additionally, R was faster than S, and Q was slower than P. Moreover, it was observed that Q was not the slowest among the group of monkeys.

Set P as 1, Q as 2, R as 3, S as 4. From the information given above, list the finishing order (from the fastest eater to the slowest eater)

[If your answer is "P, Q, R, S" then shade your answer as "1234";

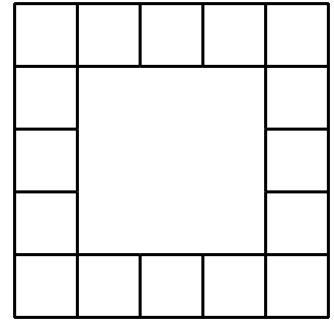
If your answer is "Q, P, S, R", then shade your answer as "2143"]

21 Given that a smaller square of side length X cm was cut from a bigger square, of side length Y cm, the resulting figure has area of 240 cm^2 . Suppose X and Y are both whole numbers, what is the largest possible value of $Y+X$?

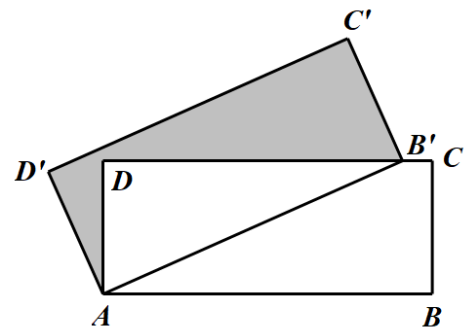


22. A university encourages all faculties to strive for a higher ratio of female students to male students. In the previous year, a certain faculty had 1473 female students and 2023 male students. To meet the target ratio of 3:4, new students were recruited in the ratio of 1 male:1 female. As a result, the new ratio of female to male students became 3:4. Find the number of new students recruited.

23. The whole numbers 1 through 16 are to be placed in the 16 squares below, one number per square, so that the Sum of the numbers in each row and column is the same. Find the largest possible sum of the four numbers in the corner squares.



24. The rectangle ABCD was rotated around point A, so that point B' lies on the side CD. Given that the ratio of $CB' : B'D = 1:20$ and the area of the shaded region is 880 cm^2 , find the area, in cm^2 , of the rectangle ABCD.



25. The number of digits required to print the page numbers of a book is twice the number of pages in the book. Assuming that each page of the book is labeled with a page number, what is the total number of pages in the book?

26. The numbers 1 to 15 can be arranged in a sequence such that every 2 consecutive numbers add up to a square number. Find the sum of the 1st number, 8th number and 15th number in this sequence.

27. The product of 4 different whole numbers is 225. Find the sum of these 4 numbers.

28. 4 people are trying to cross a river on a paddleboat that can only carry up to two people at any time. Individually, the time needed for each of them to paddle across the river is 12 minutes, 14 minutes, 28 minutes, and 32 minutes. When they cross the river together, the time needed will be the slower timing of the 2 people paddling. What is the fastest possible time, in minutes, for all 4 people to cross the river?

29. The difference and sum of two whole numbers are in the ratio 3:4. It is also known that the product of these two whole numbers is 2023. Find the larger number among these two numbers.

30. Each of the letters, F, G, M, N, O, S and U represents a different digit from 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9, such that.

$$NMOS + FUN = NUSH$$

Given that FUN is the 3-digit number 381, find the 4-digit number that represents NMOS.