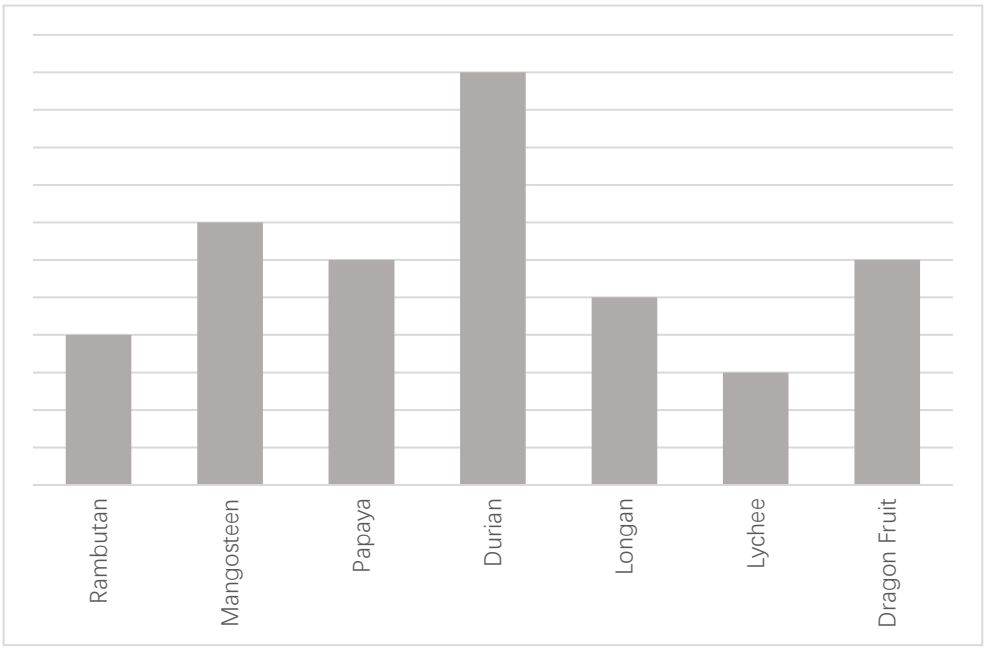
2015 NMOS Question

1. Evaluate $2015 \times \left(\frac{1}{6} + \frac{1}{30} \right)$.

2. The following bar chart shows the favourite fruit voted by P5 pupils in a particular school. Each pupil voted for one of the choices. Given that the number of pupils who voted for "Lychee" is 39, find the number of P5 pupils in the school.

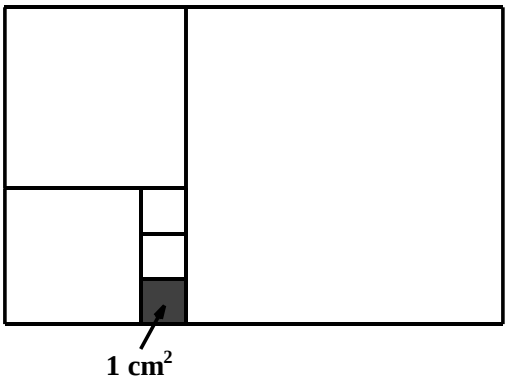


3. Three girls Alena Betty and Cheryl mentioned their heights as follow:

Alena: I am 10 cm taller than the average height of the three of us.
Betty: I am 7 cm shorter than Alena.
Cheryl: I am 130 cm tall.

What is the average height, in cm, of the three girls?

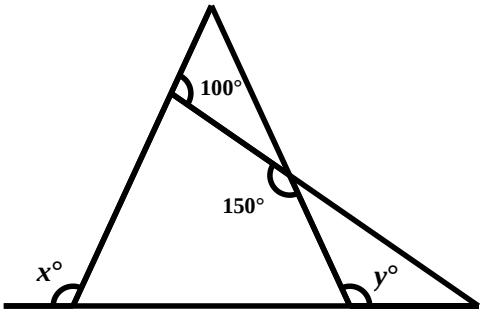
4. The figure below is made up of 6 squares where each of the 3 identical small squares is of area 1 cm^2. Find the area, in cm^2, of the whole figure.



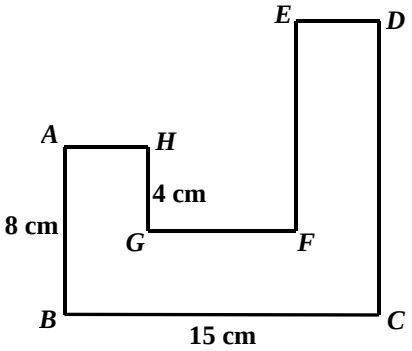
5. Last week, a class of 36 students took a Mathematics test. The average score of the class was 89. The girls' average score was 88 while the boys' average score was 91. How many girls were there in the class?

6. Alice is reading a story book. The ratio between the number of pages she has read and the number of pages she has not read is 1:5. If she reads 20 pages more, then the new ratio will be 3:5. How many pages are there in the story book?

7. In the figure below, find the value of $x + y$.

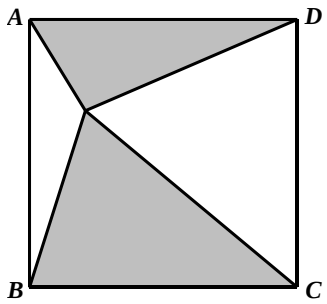


8. The following figure is of perimeter 66 cm. It is given that $AB = 8$ cm, $GH = 4$ cm and $BC = 15$ cm. Find the length, in cm, of EF.



9. Benjamin drove a car from city A to city B with constant speed. If he drove 10% faster than this speed, he will reach city B twenty minutes earlier. How long, in minutes, did Benjamin spend for his journey, using his initial speed?

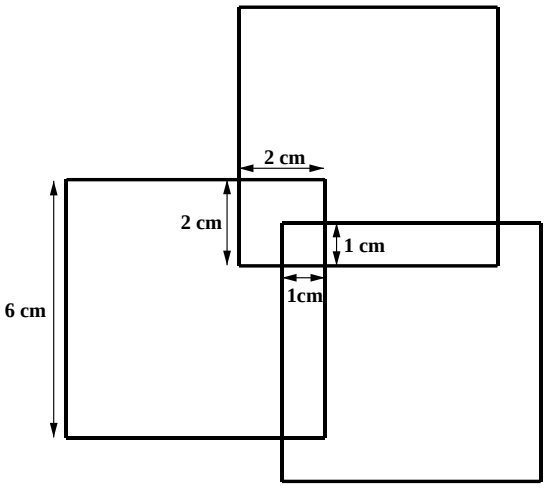
10. The figure below shows a square $ABCD$ with two shaded triangles inside. Given that the total area of the shaded triangles is 242 cm^2, find the length, in cm, of AB.



11. Benedict spent \$600 of his monthly salary and saved the rest. When he increased his spending by 35%, his saving decreased by 10%. How much, in \$, was his monthly salary?

12. There are some marbles in a box. 40% of the marbles are red. There are 12 more yellow marbles than red marbles in the box and the rest of the marbles are green. If there is a total of 132 red and yellow marbles, what is the percentage of the green marbles in the box?

13. Three 6 cm by 6 cm squares are overlaid as shown in the following figure. Find the area of the whole figure.



14. In a particular school, the number of pupils in P5 is the same as the number of pupils in P6. The ratio of the number of boys to the number of girls in P5 is 5:6, and the ratio of the numbers of boys to the number of girls in P6 is 1:1. Given that the ratio of the number of boys in P5 to the number of girls in P6 is x :110, find the value of x.

15. If Mary rides a bicycle to school and walks back home, it takes 27 minutes. If Mary walks to school and walks back home, it takes 43 minutes. How long, in minutes, does it take if Mary rides a bicycle to school and rides a bicycle back home?

16. A glass with water weighs 132 grams when it is one-third full and 173 grams when it is half full. What is the weight, in grams, of a full glass of water?

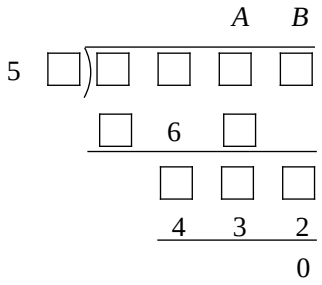
17. The extended fraction

$$\cfrac{1}{3+\cfrac{1}{3+\cfrac{1}{3+\cfrac{1}{3}}}}$$

can be expressed as a simple fraction $\frac{33}{A}$, find the value of A.

18. George rode a bicycle at a speed of 15 km/h to visit his friend who lived 9 km away. Unfortunately, the bicycle broke down after some time and George had to complete the rest of the journey by walking, at a speed of 6 km/h. If George spent an hour for the entire journey, how far, in m, had George walked?

19. In the following division problem, the blanks represent missing digits. If A and B represent the digits of the quotient, find the value of $A \times B$.



20. There are some black marbles and white marbles in a box. At first, the ratio of the number of black marbles to the number of white marbles was 6:7. After 50 black marbles and 25 white marbles were removed from the box, the ratio of the number of black marbles to the number of white marbles became 14:17. What was the number of white marbles at first?

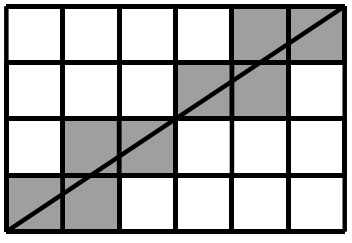
21. If $\frac{1}{20}+\frac{12}{35}-\frac{23}{63}=\frac{1}{m}$, find the value of m.

22. A three-digit number $\overline{abc}$ is such that

- $\overline{abc}$ is a multiple of 9.
- The two-digit number $\overline{bc}$ is a multiple of 13.
- The two-digit number $\overline{ab}$ is a prime number.

Find the sum of all such possible three-digit numbers.

23. The figure below shows a 6×4 grid with the diagonal passing through 8 squares (shaded, as shown). How many squares will the diagonal of a 2015×15 grid pass through?



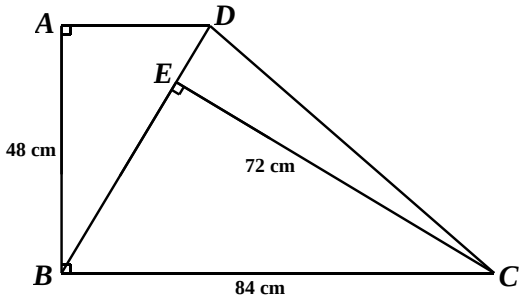
24. A group of cars, each of which is 4-metre-long, move in one straight line and the distance

between any two consecutive cars is 10 metres. The speed of the cars is 4 metres per second. This group of cars passes a bridge of 200 metres completely in 100 seconds. How many cars are there in the group?

25. The last 4 digits of the sum $1+11+111+1111+11111=12345$ is 2345.
What are the last 4 digits of the following sum

$$1+11+111+1111+\cdots+\underbrace{111\cdots1}_{2015\text{ '1's}}?$$

26. The figure below shows a quadrilateral $ABCD$ with $\angle BAD=\angle ABC=90°$. The point E is on the diagonal BD for which $\angle CED=90°$. Given that $AD=48$ cm, $CB=84$ cm, and $CE=72$ cm, find the length, in cm, of BD.



27. Timmy has 3 apples, Tom has 2 apples and Darryl has none. Assume that all the 5 apples are of the same sizes and of the same qualities. Three of them finished the apples with equal shares. After that, Darryl paid Tom 40 cents for Tom's apple. How much, in cents, should Darryl pay Timmy for Timmy's apple?

28. The prime numbers

11, 13, 17, 19, 23, 29, 31 and 37.

are divided into two groups A and B. Suppose the sum of numbers in A is x and the sum of numbers in B is y. Given that x is a multiple of y, what is the smallest value of y?

29. From 4:00 a.m. to 12:00 noon of the same day, how many times will the hour hand and the minute hand of a clock form an angle of 150°?
(One such example is when the time is very close to 4:49 a.m.)

30. Five athletes participated in a 400-metre race, and they had a conversation after the race.

Athlete No. 53:	The champion has an even athlete number.
Athlete No. 78:	No, I am the fastest among all athletes with even numbers, but I am not the champion.
Athlete No. 115:	The champion has an athlete number divisible by 5.
Athlete No. 254:	But it cannot be you, Athlete 115, because I was faster than you. By the way, I was ranked 2nd.
Athlete No. 700:	No, I was ranked 2nd.

It is known that at most two athletes made incorrect statements. Find the sum of the numbers of the athletes who were ranked 1st and 2nd.