

Non-Routine Questions 1

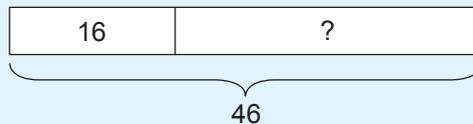
Notes

Heuristics: Representation of Problem

In problem solving, we often use representations in our solutions to show our understanding of the problems. Using representations also allow us to understand the mathematical concepts and relationships as well as to manipulate the information presented in the problems. This problem solving technique enables us to express our understanding in various ways. Examples of such representations are diagrams and lists or tables.

Drawing a diagram

Using diagrams as a form of representations is beneficial to us. Diagrams allow us to consolidate or organise the information given in the problems. By drawing a diagram, we can therefore see the problem in a clear manner and solve it effectively. One of the most popular diagrams is the pictorial model.



An example of a pictorial model

Creating a list/table

Some problems require us to solve it by creating a list or table. By doing this, we are able to see the combination or sequence in a systematic manner. A list or table can help us organise the information that is useful for analysis. After analysing, we can then see a pattern which can be used to solve the problem.

Mum	Dad	Son
Mum	Son	Dad
Dad	Mum	Son
Dad	Son	Mum
Son	Dad	Mum
Son	Mum	Dad

An example of a table that shows the arrangement of positions in a family portrait

There are some word problems in this chapter that you can apply this problem solving technique. Identify these problems and practise solving them using the technique.

Do these questions on another piece of paper.

1. Look at the pattern below. Fill in each empty box with the correct answer.

1234	973 626	789
2345		678
3456		567

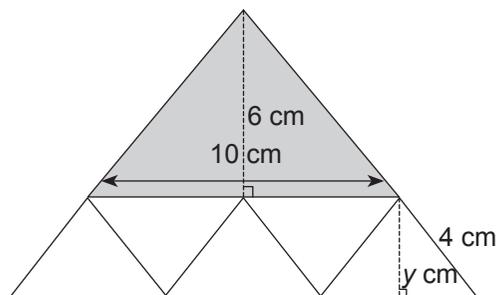
2. I am a 7-digit number. All my digits are different. The first, third, fifth and last digits are all even numbers. The rest of the digits are odd numbers. When you add the digit on your left to the next digit, you will get 975979. What number am I?
3. Grandma wants to cut an orange and give equal share to her 4 grandchildren. Her grandchildren challenge her to cut the orange with the least number of cuts. Explain how Grandma can meet the challenge.
4. The ratio of the number of stamps collected by Jason to the number of stamps collected by Marcus is 1 : 2. The ratio of the number of stamps collected by Marcus to the number of stamps collected by Andy is 5 : 7. If the difference between the number of stamps collected by Marcus and Andy is 144, what is the difference between the number of stamps collected by Jason and Andy?

5. Fill in the empty box with the correct answer.

6	2	8
10	18	28
46		120

6. The total number of sweets in containers A, B and C is 1020. The number of sweets in container A is 136 fewer than the number of sweets in container B. The number of sweets in container C is 136 more than the number of sweets in container B. What is the ratio of the number of sweets in container A to the number of sweets in container B to the number of sweets in container C?

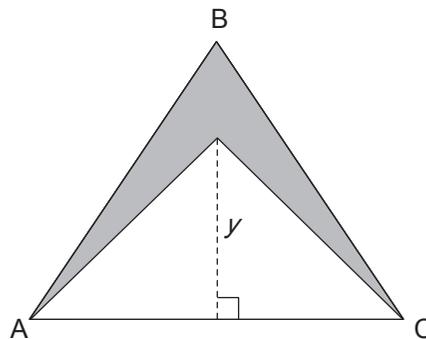
7. The figure below is made up of 5 identical triangles and a big shaded triangle. Find the area of each unshaded triangle if y is $\frac{2}{3}$ of the height of the big shaded triangle.



8. Christine earns a 4-digit salary. The first digit is $\frac{2}{3}$ of the second digit. The second digit is $\frac{3}{4}$ of the third digit and the third digit is $1\frac{3}{5}$ of the last digit. If the last digit is 5, how much does Christine earn?

9. M is a number between 60 and 90. When M is divided by 4, it has a remainder of 3. When M is divided by 5, it also has a remainder of 3. What is M?

10. The height of triangle ABC is 8 cm. Its base is $1\frac{3}{4}$ times as long as its height. Find the shaded area if y is $\frac{3}{4}$ of the height of triangle ABC.



11. Kelly is 5 years older than Kimberly. Kimberly is $\frac{3}{4}$ times as old as Kelvin. The total age of the three children is 65. Who is the oldest among the three of them? What is the age of the oldest person?
12. I am a 4-digit number. The ratio of my first digit to my second digit is 3 : 1. The ratio of my third digit to my last digit is 1 : 3. The ratio of my first digit to my last digit is 2 : 3. If all my digits add up to 20, what number am I?