

Sample Aptitude Test Questions

THIS IS NOT A PASS/FAIL TEST. Your place will be determined by the grade you achieve at GCSE.

Your whole paper will be considered for signs of mathematical reasoning. You are better off completing half the test well than the whole test badly.

You will not be given a score, you will be placed into one of three categories:

1) You are an excellent fit for the Maths School

2) You are a good fit for the Maths School, focus on getting a grade 8 or above in your GCSE and read around the subject

3) We have some concerns as to whether you would cope at a Maths School – work hard to secure a grade 8 or above, and try to develop your fluency

Some questions will be straightforward tests of the mathematics you know. These questions will probably be like the ones you do at school. They may well test your mental arithmetic/basic operation skills such as long multiplication/division

1. Sami buys 25 mugs for £0.84 each. He gives away 4 of them and sells the rest at £1.40 each.

What percentage profit does he make?

2. A *Finest* cream dessert is sold in tubs of 450ml which contain 125ml of cream. A *Superb* cream dessert is sold in tubs of 375ml which contain 105ml of cream.

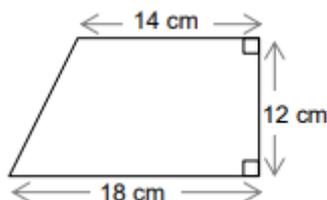
Which cream dessert contains the greater proportion of cream?

3. Solve the equations:

a) $\frac{1}{6}x - \frac{1}{4}(x - 5) = 1$

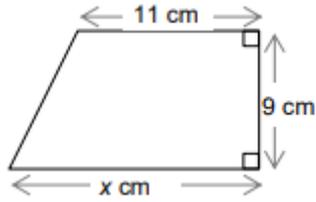
b) $\frac{x}{x-1} = \frac{x+1}{x-2}$

Some questions might expect you to work backwards through a problem. For example, you could probably work out the area of this trapezium easily enough



but question 4 asks you to work backwards through a similar problem

4. The area of this trapezium is 117cm^2 . What is the length x cm of its base?



Some questions might be puzzles, which just expect you to be prepared to play intelligently with numbers:

5. The five-digit numbers 91723 and 85604 use all ten digits between them. The difference between these numbers is $91723 - 85604 = 6119$.

Find two five-digit numbers which use all ten digits between them and which have the *smallest possible* difference.

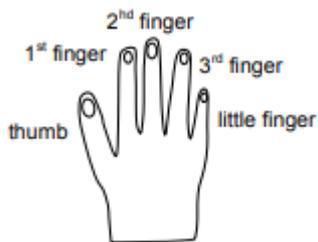
6. Find three different whole numbers A, B and C, so that

- B is the average of A and C
- A^2 is the average of B^2 and C^2

Note that not all of the numbers can be positive

Some questions might expect you to explain your reasoning, as well as just give an answer.

7. A boy counts on his fingers, backward and forwards across his right hand as follows: thumb, 1st finger, 2nd finger, 3rd finger, little finger, 3rd finger, 2nd finger, 1st finger, thumb, 1st finger, and so on.



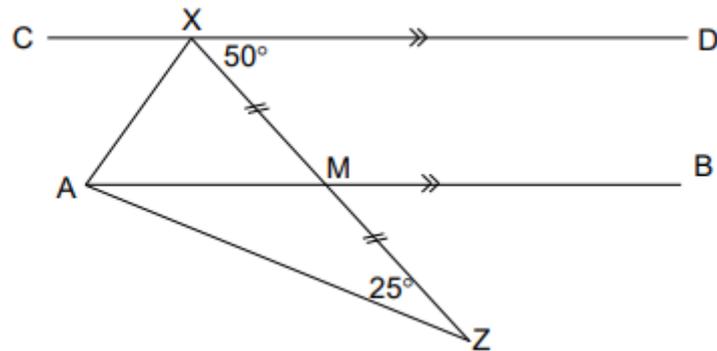
If he starts counting at one on his thumb, which finger will he be on when he reaches two thousand and thirteen?

Explain clearly how you decided.

Geometry questions will definitely need you to explain how you came up with your solution – keep the explanations short, stating the angle fact you are using.

8. In the diagram, line CD is parallel to line AB, and M is the midpoint of line XZ.

Angle DXM = 50° and angle MZA = 25°



Find angles

i) MAZ

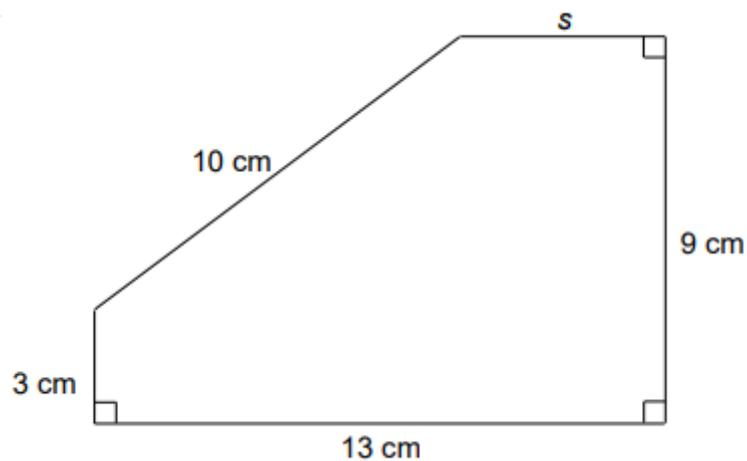
ii) CXA

showing and explaining each step in your working.

You may need to add additional lines to a diagram you are given.

9. The diagram shows an irregular pentagon. The lengths of four of the sides are shown in the diagram. Three of the angles in the pentagon are right angles, as shown.

Find the length of the side marked s.



Some questions will ask you to use the algebra that you have learnt. Question 10 is probably familiar to you from questions you have done at school, question 11 is harder and involves ratios. Question 12 requires you to call something 'x' without explicitly telling you to do so.

10. Five bananas and two kiwi fruit cost £2.30, and four bananas and three kiwi fruit cost £2.47.

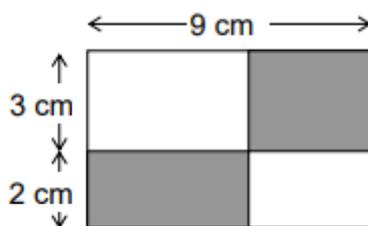
How much would it cost to buy two bananas and one kiwi fruit?

11. In September, there were three times as many boys as girls in a class.

In October, two new girls joined the class and one of the boys was expelled. Now there were only twice as many boys as girls in the class.

How many boys and girls were there in the class in September?

12. The two shaded rectangles have equal area. What is the total shaded area?



There will be a longer question, which might describe a new situation, or lay out steps in an algorithm, and ask you to apply those steps. You will need to work through an easy example or two and work out what is happening, then later parts will require you to think quite hard about what you have found out.

13. To **double** a number means to multiply it by two.

In this question, we define 'to **twiddle**' a number means adding four to it, and 'to **flip**' a number will mean to subtract it from 8 (so flipping 3 gives 5, flipping -1 gives 9 etc.)

a) If you twiddle a number and then twiddle the answer, the overall effect is to add eight to the number.

What would the overall effect of the two operations be if you:

i) flip a number and then flip the answer?

ii) twiddle a number and then flip the answer?

iii) flip a number and then twiddle the answer?

b) Show that if you twiddle a number, flip the answer and then twiddle the answer to that, this has the same overall effect as just flipping once.

c) Find a sequence of three operations, each a twiddle or a flip, that has the overall effect of just changing the sign of the number (e.g. 3 becomes -3, or -7 becomes 7)