

Maths Home Learning Task 1

Year 8

Algebra

Name _____

Tutor Group _____

Teacher _____

Given out: Monday 11 November

Hand in: Monday 18 November

Parent/Carer Comment

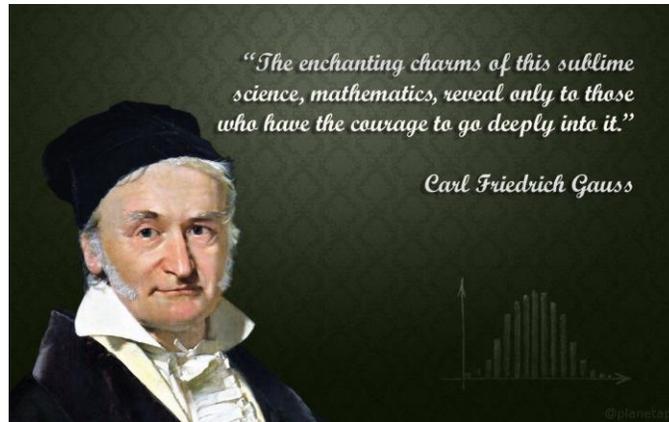
Staff Comment:

ATL

Target:

Reading Task

Carl Friedrich Gauss, Mathematician



"The enchanting charms of this sublime science, mathematics, reveal only to those who have the courage to go deeply into it."

Carl Friedrich Gauss

Carl Friedrich Gauss made many discoveries in mathematics, astronomy, and physics. A magnetic unit of measurement is named for him. Gauss was born on April 30, 1777, in Brunswick, now part of Germany. His parents were uneducated, working class people. It was clear at an early age that Carl was a "Wonder Child." At the age of two, he taught himself the alphabet and could read aloud. At the age of three, he corrected a mistake his father had made in adding a list of numbers on paper. Carl had added them correctly in his head.

Another famous story about Carl's amazing mathematical ability happened when he was in third grade. His teacher, to keep Carl busy, told him to add all the numbers from one to one hundred. He expected this would keep the seven-year-old Carl busy for some time. To his teacher's amazement, Carl had the correct answer in just a few minutes! Would you like to learn Carl's secret?

Carl noticed that he could pair the numbers, and each pair of numbers had the same sum. For instance, one plus one hundred is one hundred one. Two plus ninety-nine is one hundred one. Three plus ninety-eight is one hundred one. Then he realized he would have fifty pairs of numbers whose sum was one hundred one. Then he could multiply fifty times one hundred one to get the sum of all the numbers from one to one hundred. The answer is 5,050.

Let's try another example. Suppose I asked you to add the even numbers from one to twenty. First, you might list the even numbers: 2, 4, 6, 8, 10, 12, 14, 16, 18, and 20. Now pair the numbers: the highest with the lowest, then second-highest with second-lowest, and so on. $20 + 2 = 22$. $18 + 4 = 22$, and on to $10 + 12 = 22$. How many pairs of numbers do you have? You should have five pairs of numbers whose sums are twenty-two. Twenty-two multiplied by five equals one hundred ten. Now use a calculator to actually add the even numbers from one to twenty. You can use the list above. They do add up to one hundred ten! This method will work on any list of numbers! You just need to know how many pairs of numbers you will have and the sum of the pairs. Then multiply those numbers together. Now, imagine how difficult adding the numbers from one to one hundred would be without a calculator!

Carl continued to solve many mathematical and scientific problems throughout his lifetime. He failed to publish many of his ideas at the time of discovery. It has been said that he could have advanced the field of mathematics by fifty years if he had shared his ideas when he came up with them. He is considered one of the very best mathematicians in history.

Task 1 - Substitution

Solve these problems using substitution.

For example; when $a = 4$ and $b = 3$

What is $a + b$? $4 + 3 = 7$

Question 1.

$$a = 3$$

$$b = 2$$

$$a + b = \boxed{}$$

$$a - b = \boxed{}$$

Question 2.

$$a = 20$$

$$b = 10$$

$$a + b = \boxed{}$$

$$a - b = \boxed{}$$

Question 3.

$$a = 10$$

$$b = 5$$

$$a + b = \boxed{}$$

$$a - b = \boxed{}$$

$$a \times b = \boxed{}$$

Question 4.

$$a = 6$$

$$b = 5$$

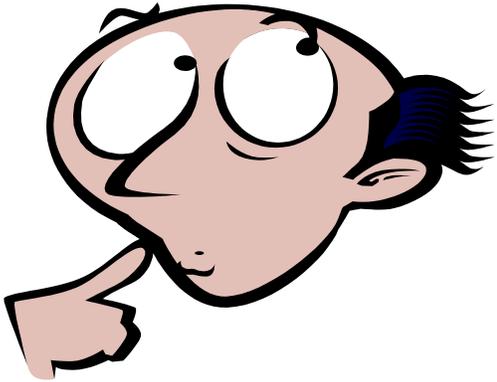
$$a + b = \boxed{}$$

$$a - b = \boxed{}$$

$$a \times b = \boxed{}$$

Task 2 - Introducing Algebra

Fill in the missing spaces.



Call the boxes
'something' +
or
'something' -

1). $\square + 4 = 7$

2). $\square + 5 = 9$

3). $\square + 9 = 11$

4). $\square + 7 = 10$

5). $15 = \square + 12$

6). $\square + 18 = 23$

7). $\square + 21 = 30$

8). $32 = \square + 23$

9). $25 = 22 + \square$

10). $19 = 7 + \square$

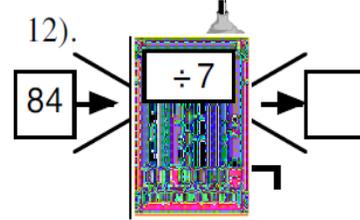
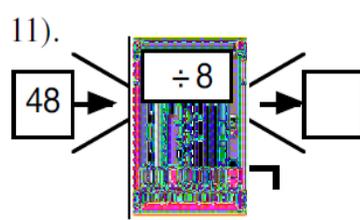
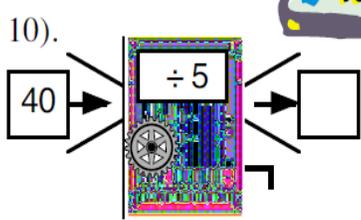
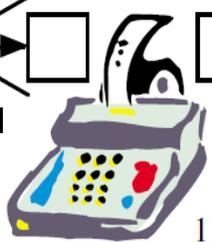
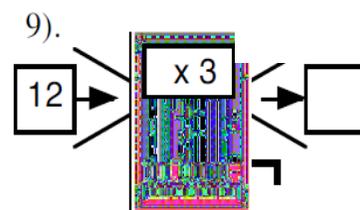
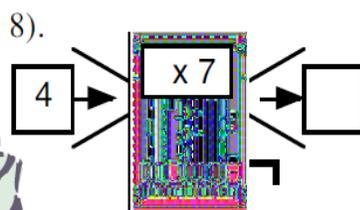
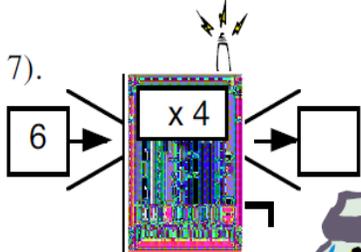
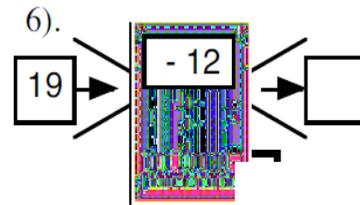
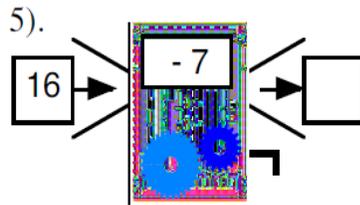
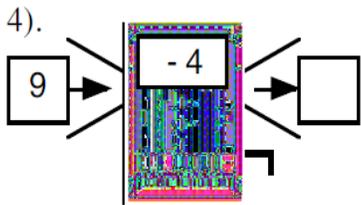
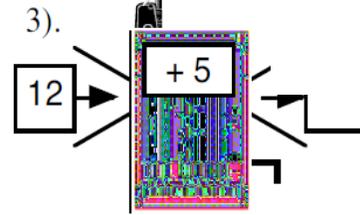
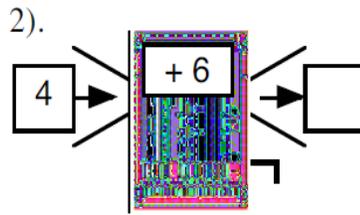
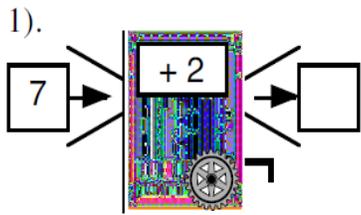
What calculation would you do to solve the following problem?

There are 25 rows of chairs. There are 28 chairs in each row. How many chairs are there altogether?

Total number of chairs =

Task 3 - Function Machines

Fill in the missing boxes. Use the space below for working out if needed.



Working Out:

Large empty rectangular box for working out the answers to the function machine problems.

Task 4 - Substituting numbers for letters

If $a = 5$, $b = 6$, $c = 3$, $d = 1$, find the value of:

a) $a + b + c =$

b) $a + c - b =$

c) $b - a - d =$

d) $a + b - c - d =$



Remember: $4a$ means $4 \times a$ and a^2 means $a \times a$

e) $a^2 =$

f) $c^2 =$



Remember: $a/2$ means $a \div 2$

g) $b/c =$

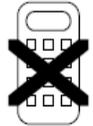
h) $(a+c) \div d =$

Task 5 - Perimeters & Algebra

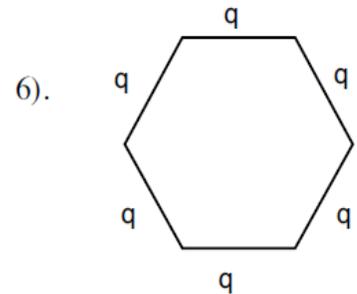
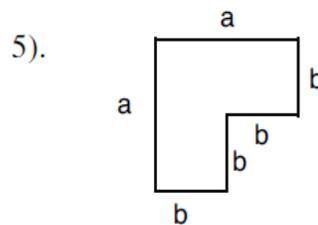
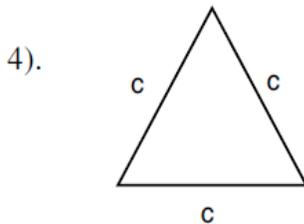
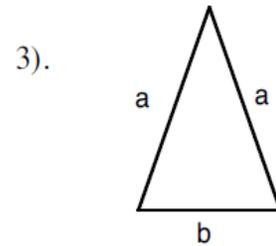
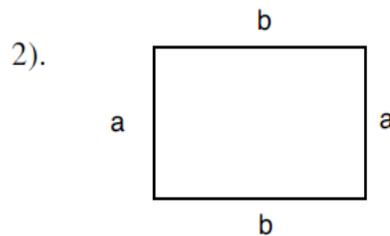
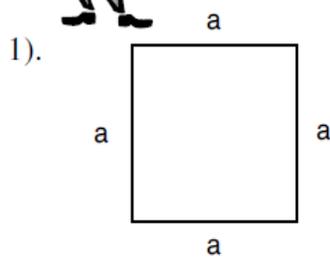
Complete the table below using the following information.



Perimeters and Algebra.



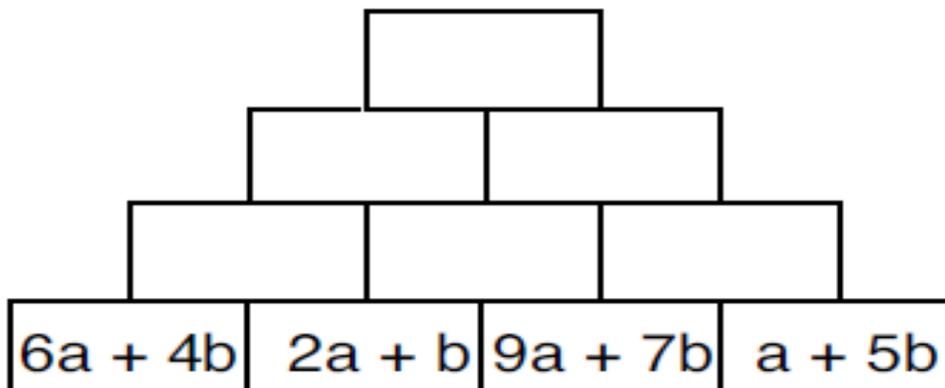
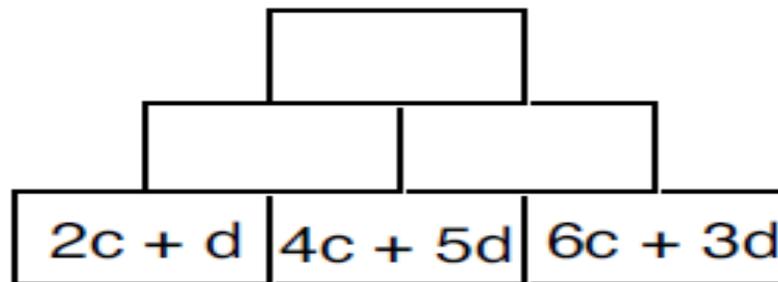
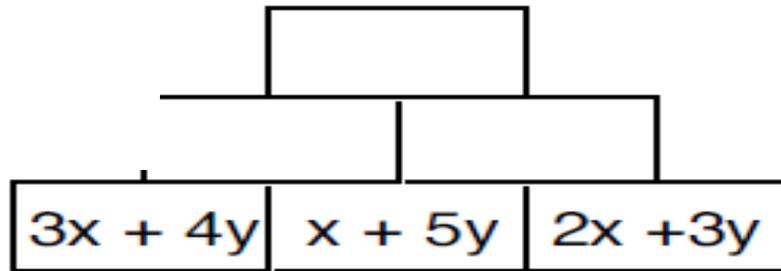
Write down an equation for the perimeter, P, of each of these shapes.
Leave the answer in its simplest form.



Shape	Equation	Simplified
1	$a+a+a+a=$	$4a$
2		
3		
4		
5		
6		

Task 6 - Algebraic Pyramids

To find the next term, add the two bricks below it. Fill in the missing boxes.



Task 7 - Magic Squares

In a magic square rows, columns and diagonals **all add up** to the same number. Complete the following magic squares and identify the magic number for each one.

	18	8
	10	
	2	

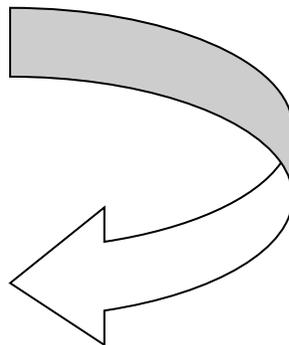


		6
	12	
18	8	

Magic Number = ____

Magic Number = ____

Now try this



Task 8 - Create your own magic square

Using the templates over the page complete A and B; make a magic square.

In a magic square the rows, columns and diagonals all add up to the same number. The number is called the Magic Number.



$a - c$	$a - b + c$	$a + b$
$a + b + c$	a	$a - b - c$
$a - b$	$a + b - c$	$a + c$



-
- A) To use the template all we do is substitute numbers for a , b and c .
Draw the magic square if $a = 8$, $b = 3$ and $c = 4$.
- B) Choose your own values for a , b and c .
Draw your own magic square using negative numbers or fractions.
What is the magic number?
Use the templates provided.



Templates for your Magic Squares

