Algebra SATs style questions

1.) What is the value of $4x + 7$ when $x = 5$?
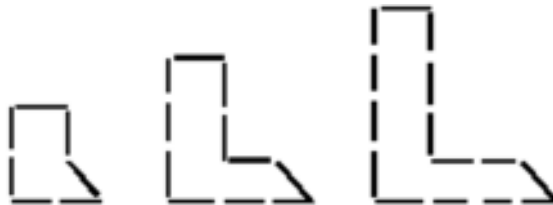
2.) ☐ and ◯ each stand for a different number.

☐ = 34

☐ + ☐ = ◯ + ◯ + ☐

What is the value of ◯ ?

3.) (a) Ann makes a pattern of **L** shapes with sticks.

Shape–number: **1**   **2**   **3**
Number of sticks: 7   11   15

Ann says :   *"I find the number of sticks for a shape by first multiplying the shape-number by 4, then adding 3".*

Work out the **number** of sticks for the shape that has shape-number **10.**

(b) Ann uses **59 sticks** to make another **L** shape in this pattern.

What is its shape-number?

(c) Here is Ann's rule again:

"I find the number of sticks for a shape by first multiplying the shape-number by 4, then adding 3".

Write a formula to work out the number of sticks for any **L** shape.

Use **S** for the number of **sticks** and **N** for the **shape-number.**

4.) n stands for a number.

Complete this table of values.

n	$5n - 2$
20	
	38

5.) **p** and **q** each stand for whole numbers.

p + q = 1000

p is 150 **greater** than **q**.

Calculate the numbers **p** and **q**.

6.) The rule for this sequence of numbers is **'add 3 each time'.**

1   4   7   10   13   16   …

The sequence continues in the same way.

Mary says, *'No matter how far you go there will never be a multiple of 3 in the sequence'.*

Is she correct? Explain how you know.

7.) k stands for a whole number.

k + 7 is greater than 100

k – 7 is less than 90

Find **all** the numbers that **k** could be.

m stands for a whole number greater than 10 and less than 20

n stands for a whole number greater than 2 and less than 10

What is the **smallest** number that **m** $\times$ **n** could be?

8.) Here are three equations.

$$a + b + c = 30$$

$$a + b = 24$$

$$b + c = 14$$

What are the values of a, b and c ?

9.) Here is an equation.

$$m - 2n = 10$$

When $n = 20$ what is the value of m?

10.) Find the value of t in this equation.

$$4 + t = 9t$$