Bronze

1a. $5^2 = 25$; $7^2 = 49$; $2^2 = 4$
2a. $4^2 = 16$; $8^2 = 64$
3a. Factors of 36 – 1, 6 and 36. 36 is a square number.
4a. $7^2 = 49$; $4^2 = 16$

1b. 6^2
2b. 5
3b. Frankie is incorrect. The array represents 2 x 5 = 10.

Silver

5a. $3^2 = 9$; $5^2 = 25$; $7^2 = 49$
6a. $3^2 = 9$; $6^2 = 36$
7a. Factors of 12 – 1, 3, 4, 12;
Factors of 16 – 1, 4, 8, 16 (square number)
8a.

2^2	2 x 2	4
4^2	4 x 4	16
11^2	11 x 11	121
8^2	8 x 8	64

4b. $8^2 + 5^2$, $12^2 + 7^2$
5b. 9, 11
6b. Laura is incorrect. To square a number, you multiply the number by itself. For example, 6^2 means 6 x 6 which is 36.

Gold

9a. Nine squared = eighty-one; ten squared = one hundred; eight squared = sixty-four.
10a. Three squared = 9; 9 x 9 = 81; 5 x 5 = 25; two squared = 4
11a. Factors of 36 – 1, 2, 3, 4, 6, 9, 12, 18, 36
Factors of 18 – 1, 2, 3, 6, 9, 18
Factors of 64 – 1, 2, 4, 8, 16, 32, 64
36 and 64 are square numbers.
12a.

12^2	12 x 12	144
7^2	7 x 7	49
8^2	8 x 8	64
3^2	3 x 3	9

7b. Various answers, for example:
$6^2 + 4^2 = 52$, $7^2 + 3^2 = 58$, $8^2 + 2^2 = 68$, $9^2 + 3^2 = 90$, $7^2 + 5^2 = 74$ and
$11^2 + 5^2 + 3^2 = 155$, $12^2 + 4^2 + 3^2 = 169$, $9^2 + 7^2 + 5^2 = 155$, $10^2 + 5^2 + 8^2 = 189$,
$10^2 + 8^2 + 3^2 = 173$
8b. 6, 11
9b. Lin is correct. Adding two odd numbers together always equals an even number. For example, 25 + 9 = 34, 9 + 49 = 58, 81 + 9 = 90 and 81 + 25 = 106.

Challenge

1. International spy Jane Band is trying to crack the code to unlock the door so she can escape the room the evil Dr Foul has trapped her in!

She has found some clues written on the wall:

- The code is made up of 3 numbers.

- The sum of all the numbers in the code is a square number.

- Two of the numbers in the code are square numbers.

- All of the numbers are odd.

Explore the possible combination of numbers the code could be.
Various answers, for example: 49, 25, 7

2. Arrange the loop cards so that each calculation is matched to the correct answer. Fill in the missing card to complete the loop.

6^2 divided by 4	130	The total of 7^2 and 9^2	244

9	The sum of 4^2 and 3^2

25	$12^2 - 5^2$

119	The product of 5^2 and 2^2

100	$8^2 - 4^2$

$10^2 + 12^2$	11

$\dfrac{x}{} = 121$	576

$8^2 \times 3^2$	48