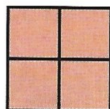


TARGET To recognise and use square numbers.

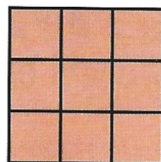
When a number is multiplied by itself you get a square number.
They are called square numbers because they make square patterns.



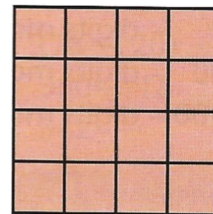
$$1^2 = 1 \times 1 = 1$$



$$2^2 = 2 \times 2 = 4$$



$$3^2 = 3 \times 3 = 9$$



$$4^2 = 4 \times 4 = 16$$

A

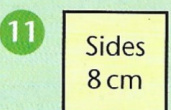
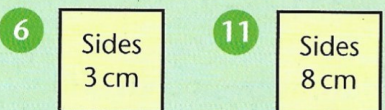
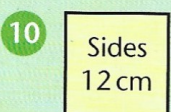
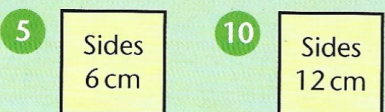
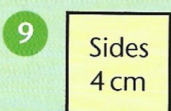
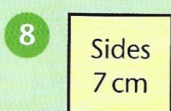
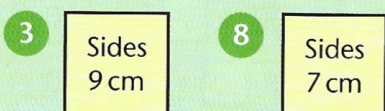
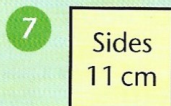
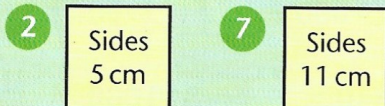
- 1 Complete this table up to 12^2 .

$$1^2 = 1 \times 1 = 1$$

$$2^2 = 2 \times 2 = 4$$

$$3^2 = 3 \times 3 = 9$$

Work out the area of each square.



B

Work out

1 $5^2 + 2^2$

7 $10^2 + 6^2$

2 $11^2 + 4^2$

8 $7^2 + 3^2$

3 $6^2 + 3^2$

9 $12^2 + 1^2$

4 $7^2 - 4^2$

10 $10^2 - 5^2$

5 $9^2 - 5^2$

11 $11^2 - 9^2$

6 $8^2 - 2^2$

12 $8^2 - 4^2$

Work out

13 10^2

19 70^2

14 20^2

20 50^2

15 60^2

21 40^2

16 80^2

22 90^2

17 30^2

23 120^2

18 110^2

24 100^2

Find a pair of square numbers which give a total of:

25 20

31 2000

26 85

32 6500

27 37

33 9000

28 89

34 14 900

29 153

35 6100

30 170

36 7200

C

Work out

1 100^2

7 $100^2 - 70^2$

2 200^2

8 $40^2 + 20^2$

3 500^2

9 $70^2 - 30^2$

4 800^2

10 $60^2 + 50^2$

5 600^2

11 $90^2 - 30^2$

6 1000^2

12 $80^2 + 40^2$

Lagrange's Theorem

Every whole number can be written as the sum of four or fewer square numbers.

Examples

$$19 = 16 + 1 + 1 + 1$$

$$35 = 25 + 9 + 1$$

Make the following numbers from four or fewer square numbers.

13 23

19 123

14 31

20 142

15 48

21 483

16 63

22 933

17 79

23 3485

18 96

24 8058