

# Square Numbers Activity Booklet



# Square Numbers

<b>1<sup>2</sup></b>	<b>1 × 1 =</b>	<b>1</b>
<b>2<sup>2</sup></b>	<b>2 × 2 =</b>	<b>4</b>
<b>3<sup>2</sup></b>	<b>3 × 3 =</b>	<b>9</b>
<b>4<sup>2</sup></b>	<b>4 × 4 =</b>	<b>16</b>
<b>5<sup>2</sup></b>	<b>5 × 5 =</b>	<b>25</b>
<b>6<sup>2</sup></b>	<b>6 × 6 =</b>	<b>36</b>
<b>7<sup>2</sup></b>	<b>7 × 7 =</b>	<b>49</b>
<b>8<sup>2</sup></b>	<b>8 × 8 =</b>	<b>64</b>
<b>9<sup>2</sup></b>	<b>9 × 9 =</b>	<b>81</b>
<b>10<sup>2</sup></b>	<b>10 × 10 =</b>	<b>100</b>
<b>11<sup>2</sup></b>	<b>11 × 11 =</b>	<b>121</b>
<b>12<sup>2</sup></b>	<b>12 × 12 =</b>	<b>144</b>
<b>13<sup>2</sup></b>	<b>13 × 13 =</b>	<b>169</b>
<b>14<sup>2</sup></b>	<b>14 × 14 =</b>	<b>196</b>
<b>15<sup>2</sup></b>	<b>15 × 15 =</b>	<b>225</b>

The product of a number multiplied by itself.

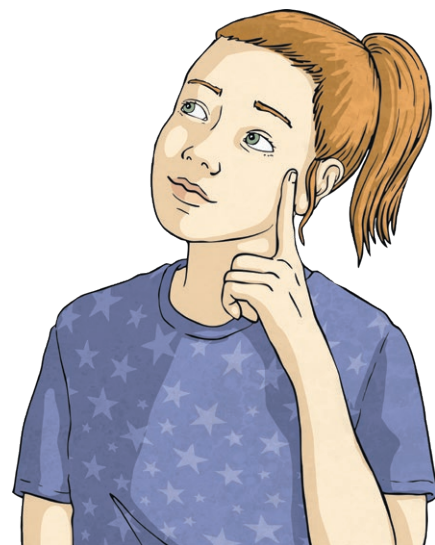
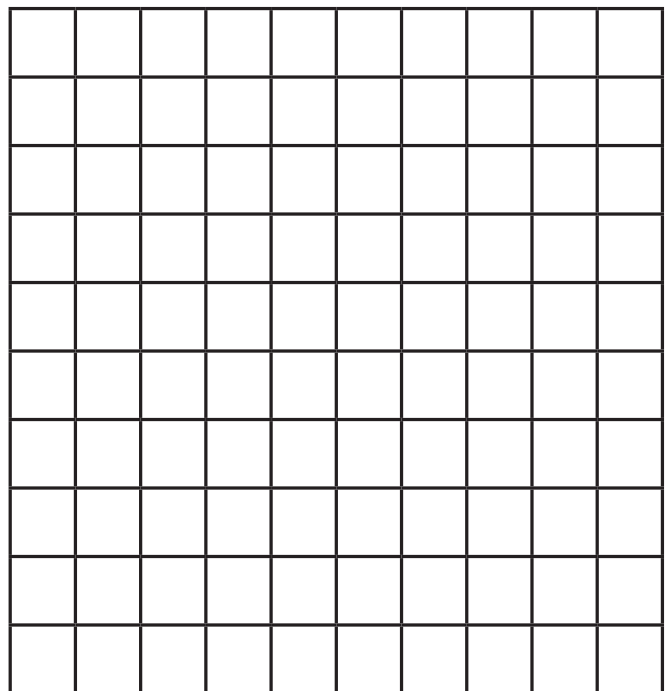
**e.g. 10 × 10 = 100**

which can be shown as:

$$10^2 = 100$$

10 squared = 100

$$10 \times 10 = 100$$

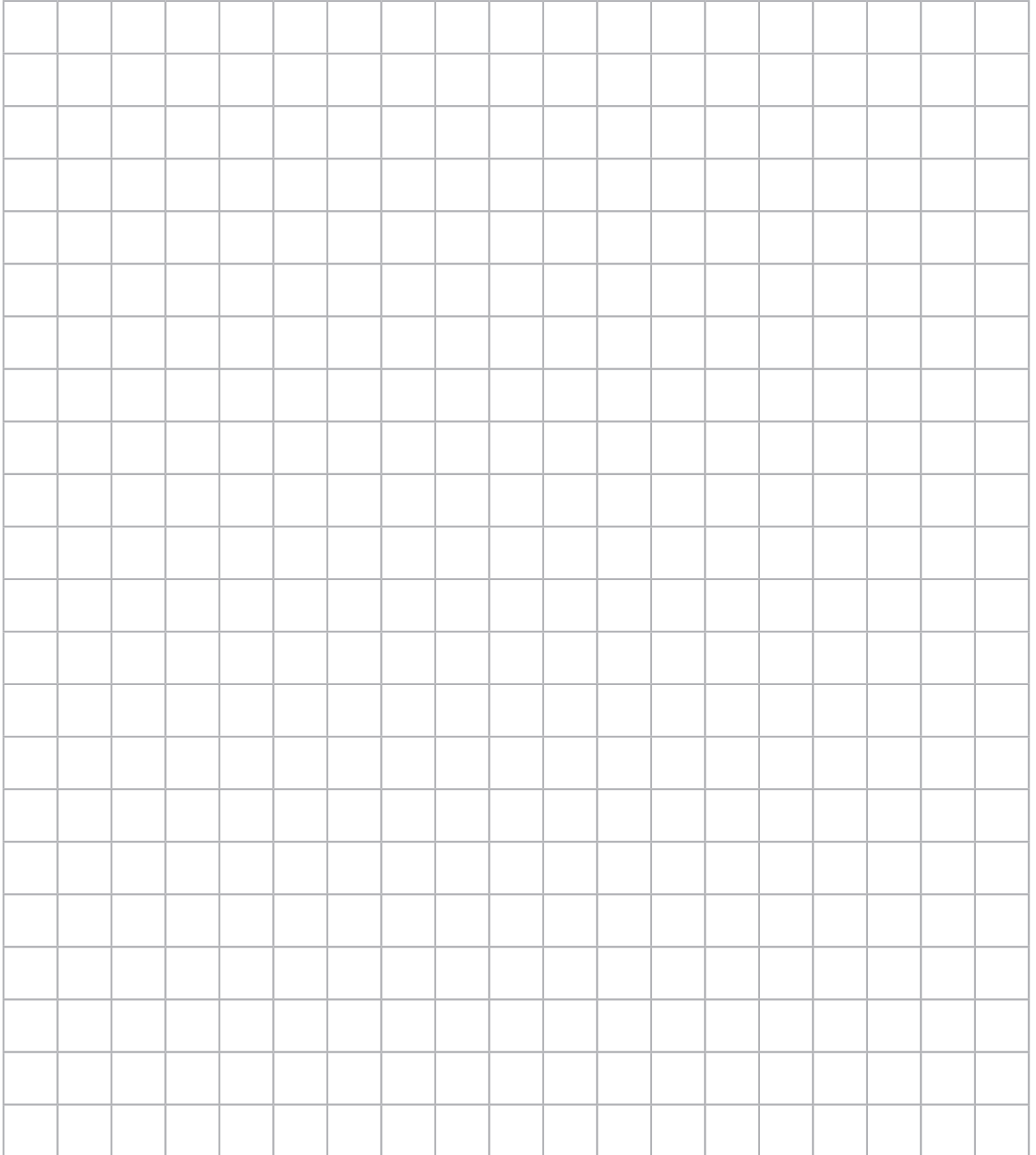






# Investigating Square Numbers

Can you continue the sequence? 1, 4, 9, 16, 25, 36, 49...



# Diving into Mastery: Square Numbers

1) Complete the missing boxes in the table to identify the first ten square numbers. You might want to use counters to create each array on your table. The first one has been done for you.



$1 \times 1$	$1^2$	1					
	$2^2$				$7^2$		
$3 \times 3$					$8 \times 8$		
		16			$9^2$		
	$5^2$						

2) Why are these numbers called square numbers?

---

3) Look at the square numbers in the table. What patterns can you identify?

---



---

1) Jess says,

" $7^2$  is 14."



Do you agree?  
Explain your thinking.

---

---

2) True or false? Justify your answers and use examples.

a) The square of even numbers is always even.

---

b) All square numbers have an even number of factors.

---

---

c) The product of two square numbers is a square number.

---

1) The sum of two square numbers is 25. What are the square numbers?

---

2) The sum of three square numbers less than 144 is another square number. What are the square numbers?

---

3) A, B and C are different square numbers less than 144. Can you find eight solutions to make this statement true?

$$A + B > B - C$$



# Square Numbers

Circle the square numbers.

1	49	66	17	36	9	144
	75	101	81		89	
100	25	4	123	46	12	64
					121	

Match the square numbers.

$2^2$

$6^2$

$3^2$

$7^2$

$11^2$

$9^2$

$12^2$

$1^2$

$4^2$

$5^2$

$8^2$

49

25

121

144

16

64

1

81

9

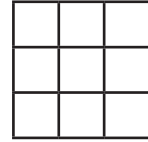
36

4



# Square Numbers

Write the number that is squared and the square number for each of these diagrams.



Number squared: \_\_\_\_\_

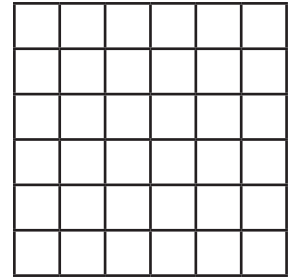
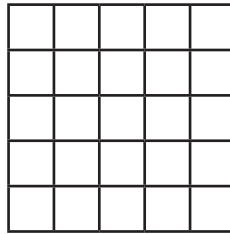
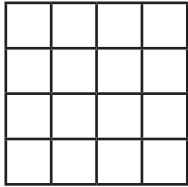
Number squared: \_\_\_\_\_

Number squared: \_\_\_\_\_

Square number: \_\_\_\_\_

Square number: \_\_\_\_\_

Square number: \_\_\_\_\_



Number squared: \_\_\_\_\_

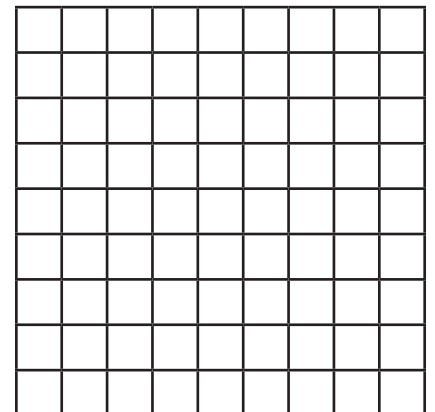
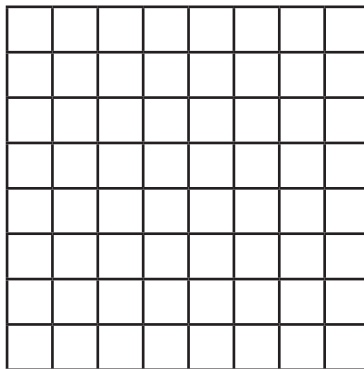
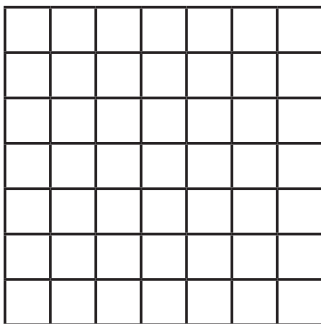
Number squared: \_\_\_\_\_

Number squared: \_\_\_\_\_

Square number: \_\_\_\_\_

Square number: \_\_\_\_\_

Square number: \_\_\_\_\_



Number squared: \_\_\_\_\_

Number squared: \_\_\_\_\_

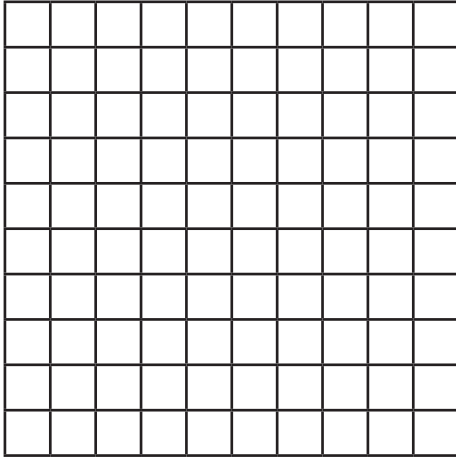
Number squared: \_\_\_\_\_

Square number: \_\_\_\_\_

Square number: \_\_\_\_\_

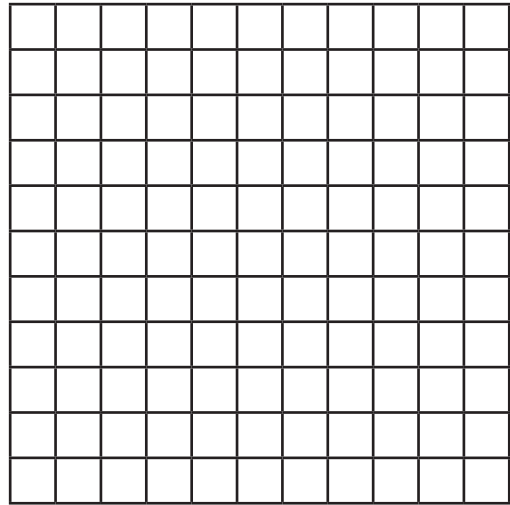
Square number: \_\_\_\_\_

# Square Numbers



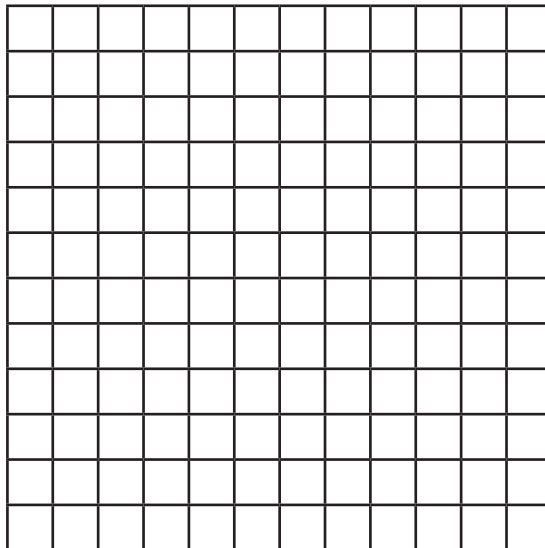
Number squared: \_\_\_\_\_

Square number: \_\_\_\_\_



Number squared: \_\_\_\_\_

Square number: \_\_\_\_\_



Number squared: \_\_\_\_\_

Square number: \_\_\_\_\_

# Square Numbers Answer Booklet



## Investigating Square Numbers

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

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

$$5^2 = 5 \times 5 = 25$$

$$6^2 = 6 \times 6 = 36$$

$$7^2 = 7 \times 7 = 49$$

1, 4, 9, 16, 25, 36, 49...

**64, 81, 100, 121, 144**

# Diving into Mastery Square Numbers



1)	$1 \times 1$	$1^2$	1	•	$6 \times 6$	$6^2$	36	
	$2 \times 2$	$2^2$	4	••	$7 \times 7$	$7^2$	49	
	$3 \times 3$	$3^2$	9	•••	$8 \times 8$	$8^2$	64	
	$4 \times 4$	$4^2$	16	••••	$9 \times 9$	$9^2$	81	
	$5 \times 5$	$5^2$	25	•••••	$10 \times 10$	$10^2$		

- A square number is the product of a number and itself. The product can be shown as a square array hence the name.
- The square numbers alternate between odd and even. The difference between consecutive square numbers is odd and follows the pattern 3, 5, 7, 9, 11 and so on.



- Jess is incorrect.  $7^2$  is the same as  $7 \times 7$  which is 49. Jess has calculated  $7 \times 2$ .
- True. The product of two even numbers is always even. For example,  $4 \times 4 = 16$ ,  $6 \times 6 = 36$ .
  - False. Square numbers have an odd number of factors as they are the result of the number being multiplied by itself. For example, the factors of 16 are 1, 2, 4, 8 and 16.
  - True. For example,  $1 \times 4 = 4$ ,  $9 \times 4 = 36$ .



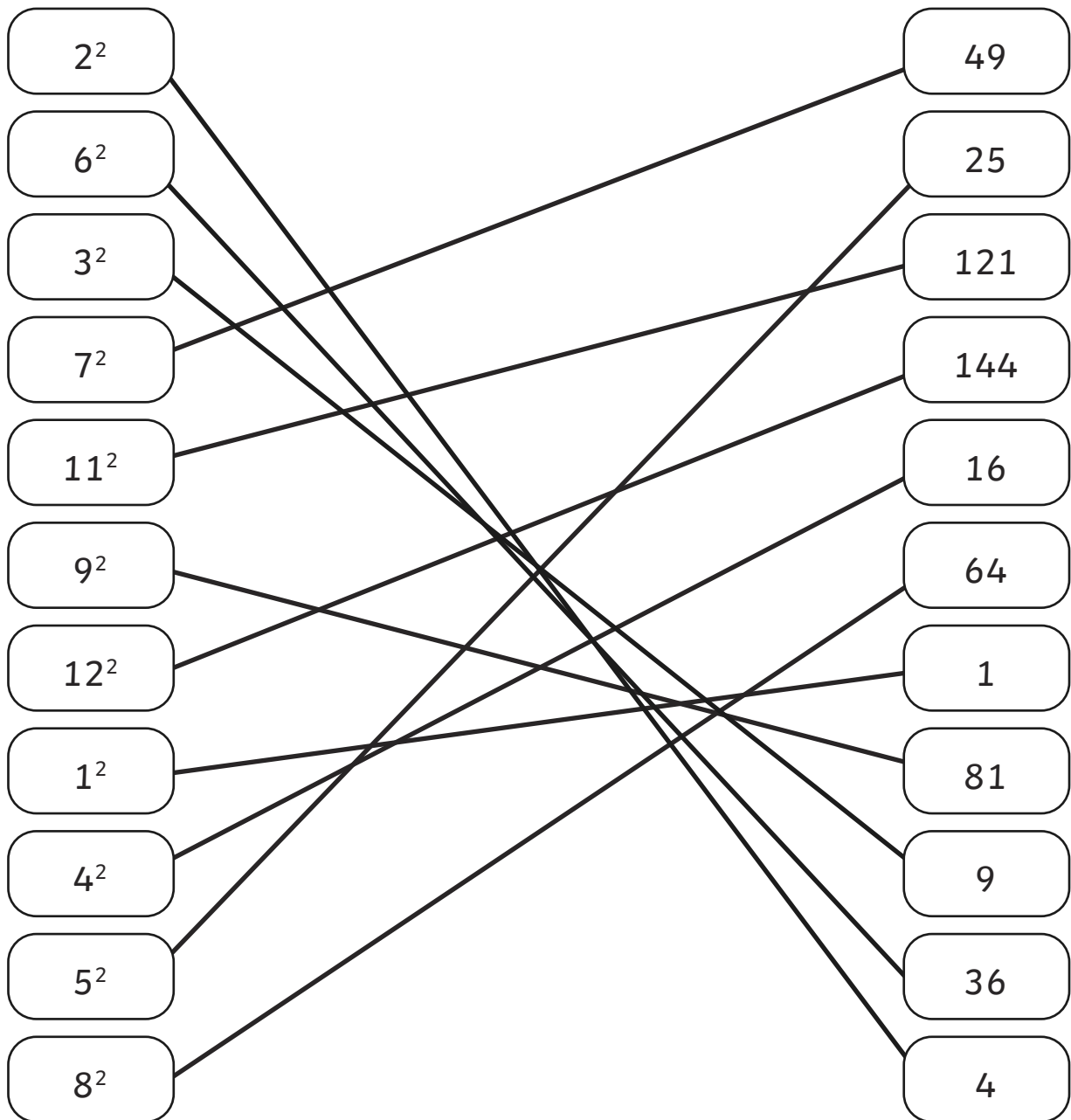
- $9 + 16 = 25$
- $4 + 9 + 36 = 49$  and  $1 + 16 + 64 = 81$
- There are many possible solutions, such as:
  - $1 + 16 > 16 - 9$
  - $1 + 16 > 16 - 4$
  - $1 + 25 > 25 - 16$
  - $1 + 25 > 25 - 9$
  - $1 + 25 > 25 - 4$
  - $16 + 4 > 4 - 1$
  - $25 + 81 > 81 - 64$
  - $36 + 49 > 49 - 16$

# Square Numbers

Circle the square numbers.

1	49	66	17	36	9	144
100	75	25	101	81	46	89
4	123	121	12	64		

Match the square numbers.



Square Numbers



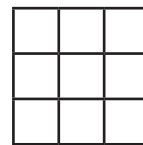
Number squared: 1

Square number: 1



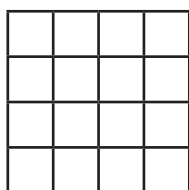
Number squared: 2

Square number: 4



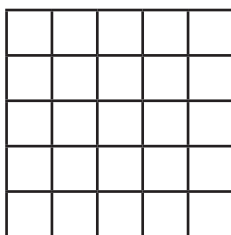
Number squared: 3

Square number: 9



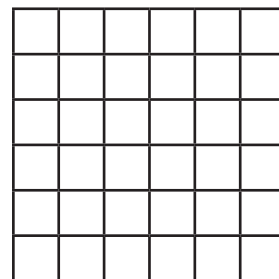
Number squared: 4

Square number: 16



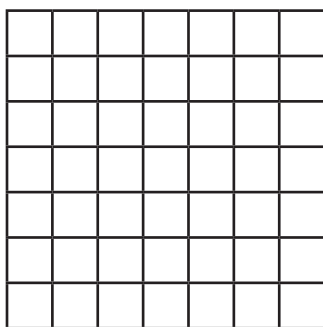
Number squared: 5

Square number: 25



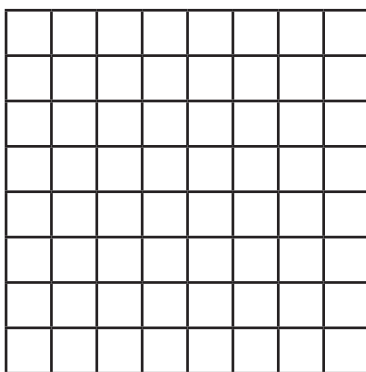
Number squared: 6

Square number: 36



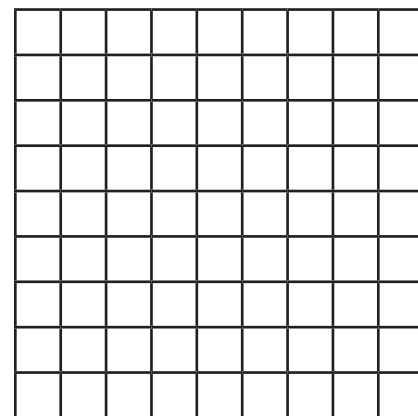
Number squared: 7

Square number: 49



Number squared: 8

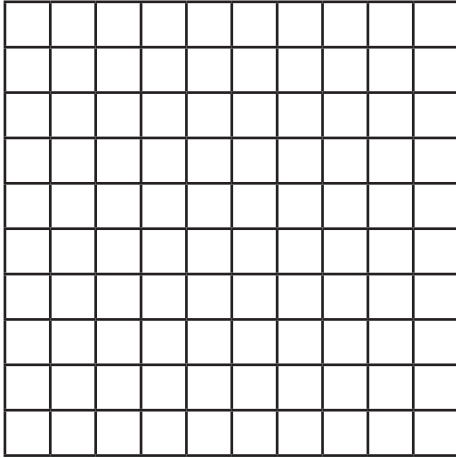
Square number: 64



Number squared: 9

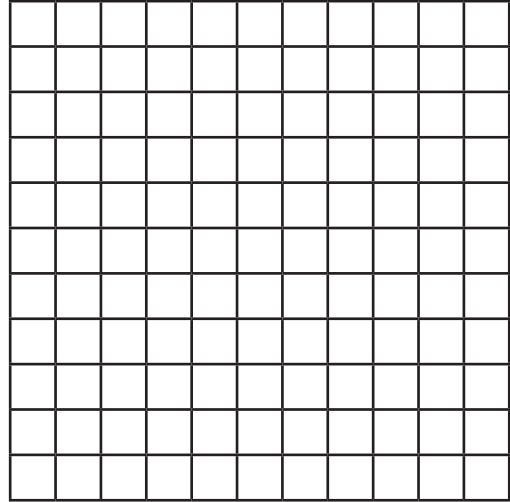
Square number: 81

Square Numbers



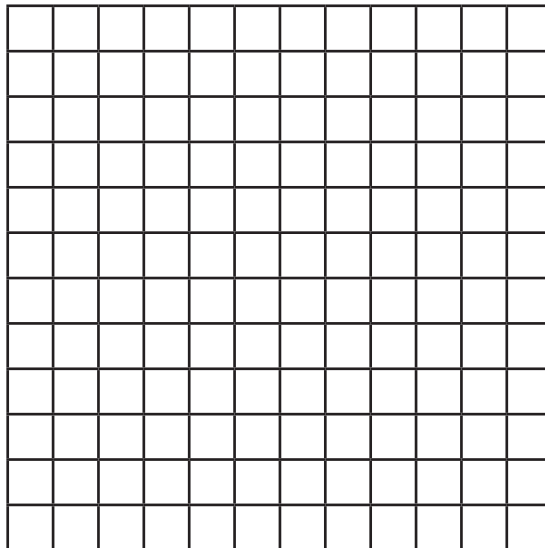
Number squared: 10

Square number: 100



Number squared: 11

Square number: 121



Number squared: 12

Square number: 144