1)

one hundred	11	**twenty-five**
43	forty-six	**121**
twenty	**196**	99
144	twelve	**eighty-one**

2) $10^2 + 10 =$ **110**

$6^2 + 4 - 5 =$ **35**

$9^2 \div 3 =$ **27**

$7^2 - 13 =$ **36**

$5^2 - 20 + 3 =$ **8**

$8^2 \div 4 =$ **16**

3) **12**$^2 = 144$

11$^2 = 121$

10$^2 - 2 = 98$

9$^2 + 10 = 91$

1) This is sometimes correct.

11 + 5 = 16 but 2 + 3 = 5

2) Jess is incorrect. She has incorrectly multiplied 100 by 2 rather than squaring it (100 × 100). The correct answer is 1000.

3) a) True. The product of two even numbers is always even. For example, 4 × 4 = 16 and 6 × 6 = 36

b) 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.

c) True. For example, 16 × 4 = 64 and 9 × 4 = 36

1) **4 + 9 + 36 = 49**
   or
   1 + 16 + 64 = 81

2) **Multiple answers possible. For example:**

   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

3) **121, 484 and 676**

1) Circle the square numbers in the table below.

one hundred	11	twenty-five
43	forty-six	121
twenty	196	99
144	twelve	eighty-one

2) Calculate:

$10^2 + 10 =$ ☐

$7^2 - 13 =$ ☐

$6^2 + 4 - 5 =$ ☐

$5^2 - 20 + 3 =$ ☐

$9^2 \div 3 =$ ☐

$8^2 \div 4 =$ ☐

3) Find the missing number in each calculation.

☐$^2 = 144$

☐$^2 = 121$

☐$^2 - 2 = 98$

☐$^2 + 10 = 91$

1)

It is possible to add together 2 prime numbers to make a square number!

Is this always, sometimes or never correct? Prove it.

2)

100^2 is 200.

Do you agree?

Explain your thinking.

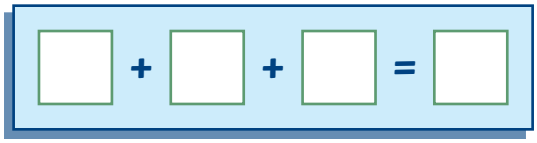
3) True or false? Justify your answers and use examples.

a) The square of even numbers is always even.

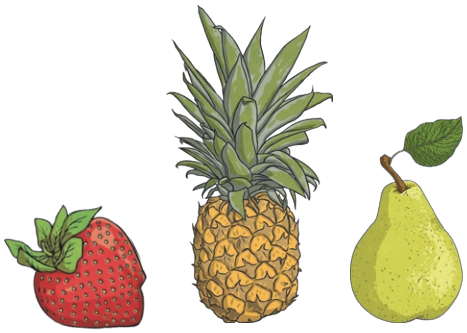
b) All square numbers have an even number of factors.

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

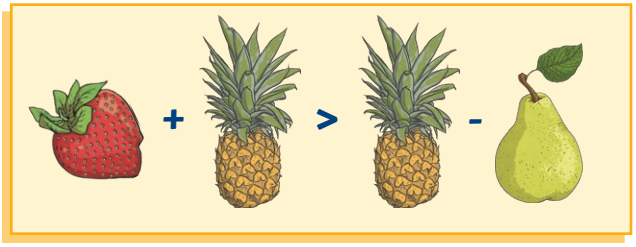
1) The sum of 3 square numbers less than 144 is another square number.
What are the square numbers? Is there only one solution?



2)



The fruits above are different square numbers less than 144. Can you find 8 different solutions to make this statement true?



3) If a number is **palindromic**, it can be read the same way forwards and backwards.

For example, **202** or **3003**.

Can you find the first 3 numbers that are square numbers and are also palindromes?
Your answers must have three digits.

1) Circle the square numbers in the table below.

one hundred	11	twenty-five
43	forty-six	121
twenty	196	99
144	twelve	eighty-one

2) Calculate:

$10^2 + 10 =$ ☐

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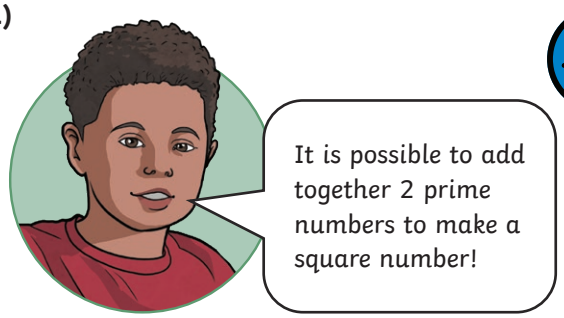
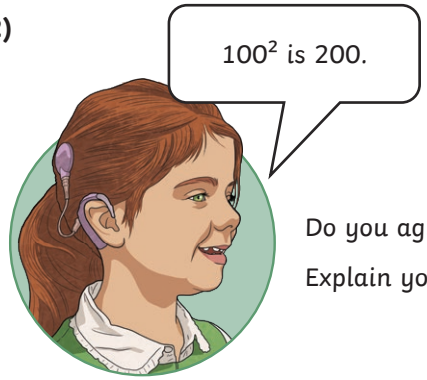
1)



Is this always, sometimes or never correct?
Prove it.

2)



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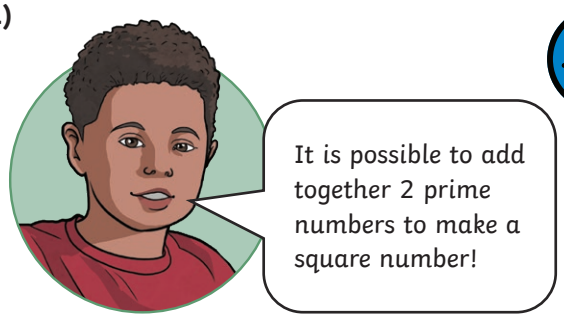
a) The square of even numbers is always even.

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

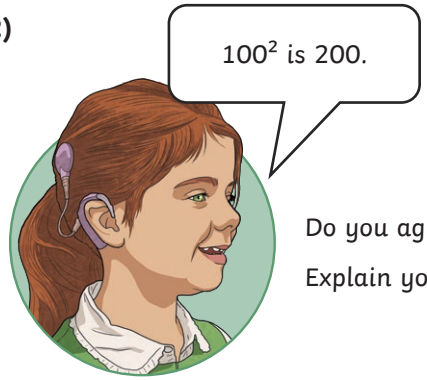
c) The product of two square numbers is a square number.

1)



Is this always, sometimes or never correct?
Prove it.

2)



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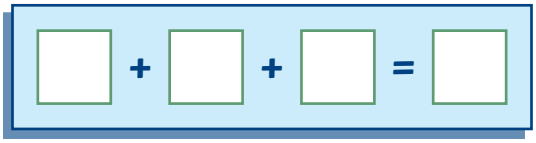
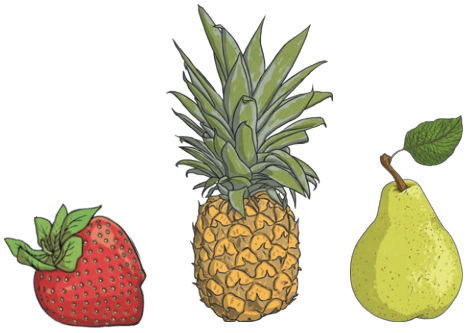
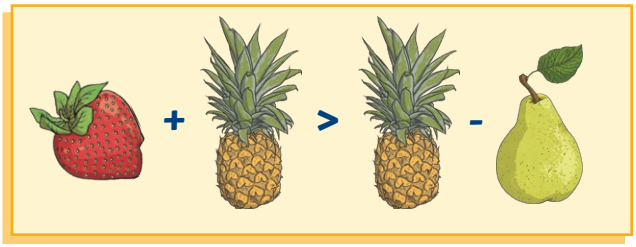
1) The sum of 3 square numbers less than 144 is another square number. What are the square numbers? Is there only one solution?



2)



The fruits above are different square numbers less than 144. Can you find 8 different solutions to make this statement true?



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For example, **202** or **3003**.

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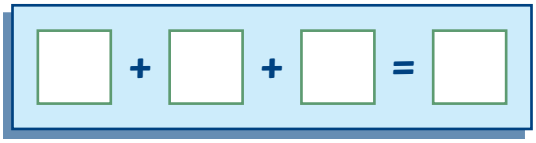
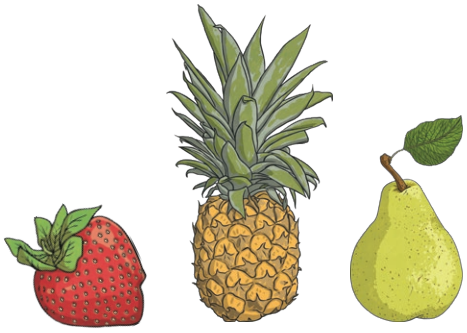


2)



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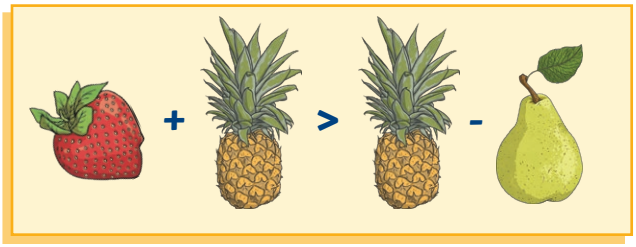

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For example, **202** or **3003**.

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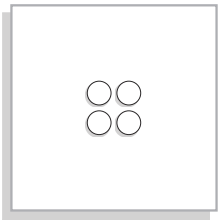
Square Numbers

To find square numbers.

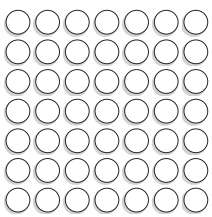
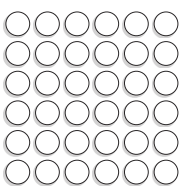
Cut out the cards below and find and match up the arrays, calculations and square number notations. Write in the answers after each equals sign to find the square numbers.

For example:



$2 \times 2 = 4$

$2^2 = 4$

Array	Calculation	Square Number Notation
	$5 \times 5 =$	$4^2 =$
	$6 \times 6 =$	$3^2 =$
	$3 \times 3 =$	$7^2 =$
	$4 \times 4 =$	$6^2 =$
	$7 \times 7 =$	$5^2 =$

Array	Calculation	Square Number Notation

Square Numbers

To find square numbers.

1) a) Shade all the square numbers on the multiplication grid.

×	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

b) What do you notice? _____

_____

_____

2) Complete the table.

Square Number Notation	Multiplication Expression	Answer
3^2		9
5^2	5 × 5	
	7 × 7	49
9^2		81
	10 × 10	
12^2	12 × 12	

3) Write <, > or = to complete the statements.

4^2 ☐ 5 × 5

7^2 ☐ 47

64 ☐ 8 squared

13 squared ☐ 163

Square Numbers

To find square numbers.

1) Complete the table.

Think about a strategy that you could use when multiplying two 2-digit numbers. You could use the partitioning method. For example, 14 × 14 can be broken down into 14 × 10 + 14 × 4.

Square Number Notation	Multiplication Expression	Answer
14^2		196
15^2	15 × 15	
		256
17^2		
	18 × 18	
19^2		

2) Write <, > or = to complete the statements.

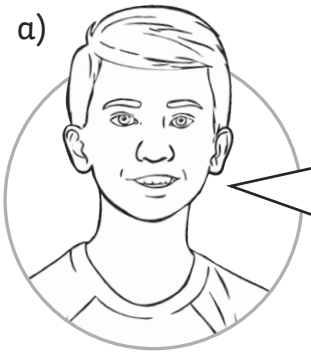
20^2 ☐ 420

30^2 ☐ 900

3500 ☐ 50 squared

100 squared ☐ 1000

3) a)



I am thinking of a number. I square it, add 12 and subtract 4. My answer is 44. What is my number?

The number is ☐ .

b)

I am thinking of a number. I square it, subtract 13 and add 7. My answer is 75. What is my number?

The number is ☐ .

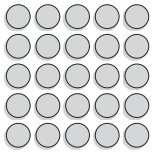
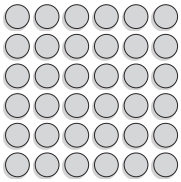
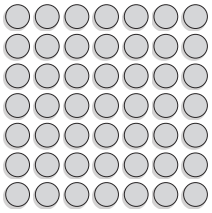
4)

The product of two square numbers always equals a square number.

Is the above statement correct? Convince me!

Square Numbers **Answers**

Cut out the cards below and find and match up the arrays, calculations and square number notations. Write in the answers after each equals sign to find the square numbers.

Array	Calculation	Square Number Notation
	$3 \times 3 = \mathbf{9}$	$3^2 = \mathbf{9}$
	$4 \times 4 = \mathbf{16}$	$4^2 = \mathbf{16}$
	$5 \times 5 = \mathbf{25}$	$5^2 = \mathbf{25}$
	$6 \times 6 = \mathbf{36}$	$6^2 = \mathbf{36}$
	$7 \times 7 = \mathbf{49}$	$7^2 = \mathbf{49}$

Square Numbers **Answers**

1) a) Shade all of the square numbers on the multiplication grid.

×	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

b) What do you notice?

The children should notice that the square numbers form a diagonal pattern through the multiplication grid.

2) Complete the table.

Square Number Notation	Multiplication Expression	Answer
3^2	**3 × 3**	9
5^2	5 × 5	**25**
7^2	7 × 7	49
9^2	**9 × 9**	81
10^2	10 × 10	**100**
12^2	12 × 12	**144**

3) Write <, > or = to complete the statements.

4^2 **<** 5 × 5

7^2 **>** 47

64 **=** 8 squared

13 squared **>** 163

Square Numbers **Answers**

1) Complete the table.

Square Number Notation	Multiplication Expression	Answer
14^2	**14 × 14**	196
15^2	15 × 15	**225**
16^2	**16 × 16**	256
17^2	**17 × 17**	**289**
18^2	18 × 18	**324**
19^2	**19 × 19**	**361**

2) Write <, > or = to complete the statements.

20^2 **<** 420

30^2 **=** 900

3500 **>** 50 squared

100 squared **>** 1000

3) a) I am thinking of a number. I square it, add 12 and subtract 4. My answer is 44.
What is my number?
The number is **6**.

b) I am thinking of a number. I square it, subtract 13 and add 7. My answer is 75.
What is my number?
The number is **9**.

4) The product of two square numbers always equals a square number.
Is the above statement correct? Convince me!

The statement is correct.
Multiplying two square numbers always equals a square number.
For example:
4 × 9 = 36, 4 × 16 = 64, 4 × 25 = 100 and 4 × 36 = 144

Square Numbers

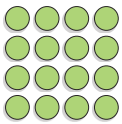
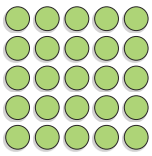
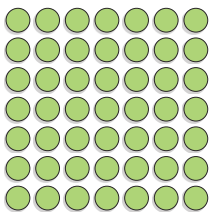
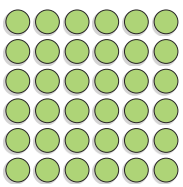
To find square numbers.

Cut out the cards below and find and match up the arrays, calculations and square number notations. Write in the answers after each equals sign to find the square numbers.

For example:

$2 \times 2 = 4$

$2^2 = 4$

Array	Calculation	Square Number Notation
	$5 \times 5 =$	$4^2 =$
	$6 \times 6 =$	$3^2 =$
	$3 \times 3 =$	$7^2 =$
	$4 \times 4 =$	$6^2 =$
	$7 \times 7 =$	$5^2 =$

Array	Calculation	Square Number Notation

Square Numbers

To find square numbers.

1) a) Shade all the square numbers on the multiplication grid.

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4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
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_____

_____

2) Complete the table.

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Square Numbers

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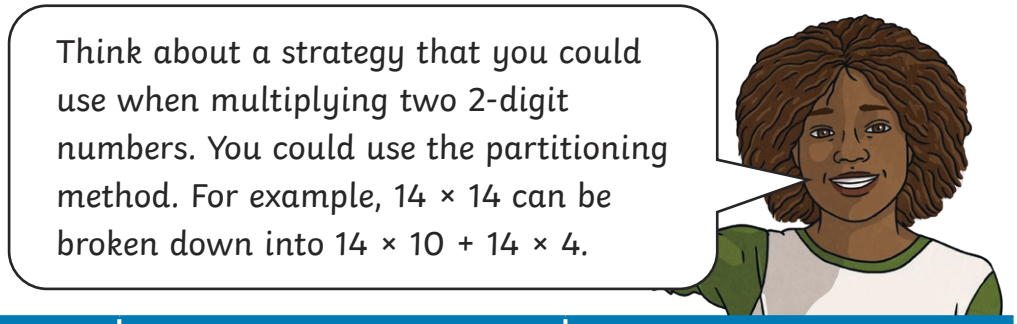

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The number is ☐ .

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The product of two square numbers always equals a square number.

Is the above statement correct? Convince me!

Square Numbers **Answers**

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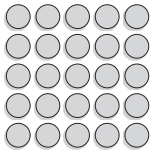
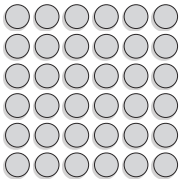
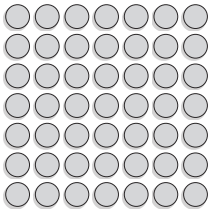
	$4 \times 4 = \mathbf{16}$	$4^2 = \mathbf{16}$
	$5 \times 5 = \mathbf{25}$	$5^2 = \mathbf{25}$
	$6 \times 6 = \mathbf{36}$	$6^2 = \mathbf{36}$
	$7 \times 7 = \mathbf{49}$	$7^2 = \mathbf{49}$

Square Numbers **Answers**

1) a) Shade all of the square numbers on the multiplication grid.

×	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

b) What do you notice?

The children should notice that the square numbers form a diagonal pattern through the multiplication grid.

2) Complete the table.

Square Number Notation	Multiplication Expression	Answer
3^2	**3 × 3**	9
5^2	5 × 5	**25**
7^2	7 × 7	49
9^2	**9 × 9**	81
10^2	10 × 10	**100**
12^2	12 × 12	**144**

3) Write <, > or = to complete the statements.

4^2 **<** 5 × 5

7^2 **>** 47

64 **=** 8 squared

13 squared **>** 163

Square Numbers **Answers**

1) Complete the table.

Square Number Notation	Multiplication Expression	Answer
14^2	**14 × 14**	196
15^2	15 × 15	**225**
16^2	**16 × 16**	256
17^2	**17 × 17**	**289**
18^2	18 × 18	**324**
19^2	**19 × 19**	**361**

2) Write <, > or = to complete the statements.

20^2 **<** 420

30^2 **=** 900

3500 **>** 50 squared

100 squared **>** 1000

3) a) I am thinking of a number. I square it, add 12 and subtract 4. My answer is 44.
What is my number?
The number is **6**.

b) I am thinking of a number. I square it, subtract 13 and add 7. My answer is 75.
What is my number?
The number is **9**.

4) The product of two square numbers always equals a square number.
Is the above statement correct? Convince me!

The statement is correct.
Multiplying two square numbers always equals a square number.
For example:
4 × 9 = 36, 4 × 16 = 64, 4 × 25 = 100 and 4 × 36 = 144