



Powers and roots

- Finding the square root of a number
- Cubing a number
- Using positive powers

Keywords

You should know

explanation 1

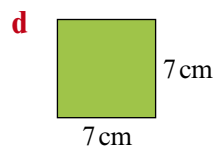
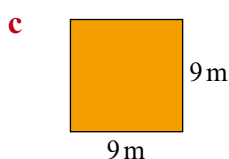
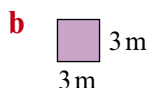
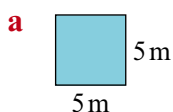
1 Copy the table. Fill in the missing square numbers.

Number	1	2	3	4	5	6	7	8	9	10
Square number	1			16					81	

2 Copy these columns of numbers. Draw lines to match each multiplication on the left with the correct square number on the right.
The first one has been done for you.

10×10	81
3×3	49
7×7	1
4×4	16
1×1	64
9×9	100
5×5	25
2×2	4
8×8	36
6×6	9

3 Find the area of each square.



e a square with sides of 8 cm

f a square with sides of 6 cm

4 Copy and complete these calculations.

a $8^2 = 8 \times 8 = \square$

b $5^2 = \square \times \square = \square$

c $7^2 = \square \times \square = \square$

d $12^2 = \square \times \square = \square$

5 Work out these squares.

a 3^2

b 4^2

c 6^2

d 8^2

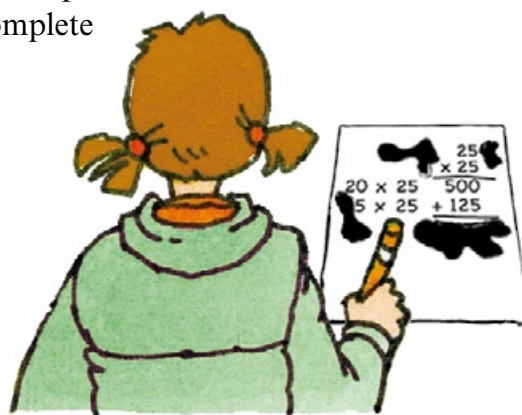
e 7^2

f 9^2

g 0^2

h 1^2

6 Chloe has calculated 25 squared but she has spilt ink on part of her working out. Copy and complete her calculation to find 25 squared.



7 a Write the numbers from this list that are square numbers.

25, 44, 9, 4, 24, 81, 56, 36, 64, 100

b Make a sum from three of the square numbers you found in part **a**.

$\square + \square = \square$

8 Work these out.

a $3^2 + 4^2$

b $5^2 + 2^2$

c $6^2 + 8^2$

d $3^2 + 7^2$

e $9^2 - 5^2$

f $10^2 - 6^2$

g $7^2 + 6^2$

h $8^2 - 7^2$

9 Find a square number that is more than 140 but less than 150.

- 10** What number multiplied by itself gives the answer 25?
This number is the square root of 25.

Copy and complete this sentence.

is the square root of 25 because \times = 25.

- 11** Find the square root of each number.


a 4 **b** 16 **c** 49 **d** 64 **e** 81

- 12** Work these out.

a $\sqrt{25}$ **b** $\sqrt{9}$ **c** $\sqrt{36}$ **d** $\sqrt{100}$

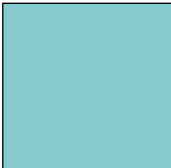
- 13** Work out the length of one side of each of these squares.

a




Area = 9 cm²

b




Area = 81 cm²

c



Area = 25 cm²

d



Area = 16 cm²

explanation 2

- 14** This diagram shows the cube number 8.

$$2^3 = 2 \times 2 \times 2 = 8$$

Copy and complete these.

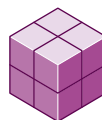
a $1^3 = 1 \times 1 \times 1 = \square$

b $2^3 = 2 \times \square \times \square = \square$

c $3^3 = \square \times \square \times \square = \square$

d $4^3 = \square \times \square \times \square = \square$

e $5^3 = \square \times \square \times \square = \square$



- 15** Copy and complete this table.

Number	1	2	3	4	5
Number cubed			27		

16 Work these out.

a half of 2^3

b double 3^3

c $2^3 + 1^3$

d $3^3 + 2^3$

e $4^3 + 3^3$

f $5^3 + 2^3$

explanation 3

17 Use your calculator to work these out.

a 17^2

b 22^2

c 26^2

d 30^2

e 1000^2

18 Use your calculator to work these out.

a 7^3

b 9^3

c 11^3

d 8^3

e 100^3

19 a Copy and complete these statements.

$10 = 10^1$

$100 = 10 \times 10 = 10^2$

$1000 = \square \times \square \times \square = 10^{\square}$

$10000 = \square \times \square \times \square \times \square =$

$100000 = \square \times \square \times \square \times \square \times \square =$

$1000000 =$

You will find it helpful to learn these results.

b Describe the pattern in the numbers in the left-hand column.

c What happens to the powers of 10 as the starting numbers increase?

20 Write these numbers using powers. The first one has been completed for you.

a $3 \times 3 \times 3 \times 3 = 3^4$

b $7 \times 7 \times 7 \times 7 \times 7$

c 5×5

d $6 \times 6 \times 6$

e $9 \times 9 \times 9 \times 9 \times 9 \times 9$

f $13 \times 13 \times 13 \times 13$

21 Write these out in full. The first one has been done for you.

a $9^3 = 9 \times 9 \times 9$

b $20^3 = \square \times \square \times \square$

c $19^4 = \square \times \square \times \square \times \square$

d $17^3 =$

e $31^4 =$