

fs4u

Powers & Roots

‘How To’ Booklet 27

Powers & Roots

Powers

5 squares is

5^2 is 5×5 is 25

5 cubed is

5^3 is $5 \times 5 \times 5$ is 125

5 to the power 4 is

5^4 is $5 \times 5 \times 5 \times 5$ is 625

Squares

Table of squares up to 10

Number (n)	Square (n^2)
1	1
2	4
3	9
4	16
5	25
6	36
7	49
8	64
9	81
10	100

Cubes

Table of cubes up to 10

Number (n)	Cube (n^3)
1	1
2	8
3	27
4	64
5	125
6	216
7	343
8	512
9	729
10	1000

Square and cubes other than whole numbers, can be obtained using a calculator; ask your tutor if you are not sure how.

Roots

Square Roots

Use the table of squares in reverse

The square root of 49 is 7. This is written $\sqrt{49} = 7$

Number (n)	Square ($\sqrt{\quad}$)
1	1
4	2
9	3
16	4
25	5
36	6
49	7
64	8
81	9
100	10

Cube Roots

Use the table of cubes in reverse

The cube root of 216 is 6. This is written $\sqrt[3]{216} = 6$

Number (n)	Cube Root ($\sqrt[3]{\quad}$)
1	1
8	2
27	3
64	4
125	5
216	6
343	7
512	8
729	9
1000	10

Square roots and cube roots, other than whole numbers, can be obtained using a calculator.

Activity

Powers

1 Find the squares of the following numbers:

a 7 b 11 c 13 d 17 e 21 f 25

2 Find the cubes of the following numbers

a 4 b 7 c 10 d 12 e 15 f 20

Roots

3 Find the square roots of the following numbers

a 36 b 81 c 121 d 196 e 225 f 625

4 Find the cube roots of the following numbers

a 8 b 216 c 512 d 719 e 1000 f 2744

Miscellaneous

Use a scientific calculator to solve the following questions (give your answers to 3 significant figures).

5

a 3.6^2 b 7.8^2 c 0.92^2 d 17.3^2 e 4.3^2 f 0.73^2

6

a 4.7^3 b 8.9^3 c 0.83^3 d 28.4^3 e 5.4^3 f 0.74^3

7

a $\sqrt{8.6}$ b $\sqrt{17.3}$ c $\sqrt{0.75}$ d $\sqrt{117.2}$ e $\sqrt{1940}$ f $\sqrt{0.159}$

8

a $\sqrt[3]{9.7}$ b $\sqrt[3]{28.4}$ c $\sqrt[3]{0.86}$ d $\sqrt[3]{117.2}$ e $\sqrt[3]{1940}$ f $\sqrt[3]{0.159}$

9 Work out the combinations.

a $4^2 \times \sqrt[3]{25}$ b $5^2 \times \sqrt{16}$ c $3^3 \times \sqrt[3]{8}$

d $2^3 \times \sqrt[3]{27}$ e $6^2 \times \sqrt{64}$ f $4^3 \times \sqrt{81}$

10

a $23.2^2 \times \sqrt{252.3}$ b $17.2^3 \times \sqrt[3]{246.3}$

c $13.2^3 \times \sqrt{456.7} \times \sqrt[3]{563.2} \times 34.5^3$