



Exploring maths



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Home Book

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N5.1 Powers and roots	1	G5.2 2D and 3D shapes	35
1 Integer powers of numbers	1	1 Exploring angles and lines	35
2 Estimating square roots	2	2 Solving problems	36
3 Prime factor decomposition	3	3 Solving longer problems	37
A5.1 Sequences and graphs	4	4 Drawing 3D objects	38
1 Generating sequences	4	5 Drawing plans and elevations	39
2 Making generalisations	5	6 More plans and elevations	40
3 Using computers	5	7 Solving problems using surface area and volume	41
4 Sketching linear graphs	6	8 Surface area and volume of prisms	42
5 Rearranging linear equations	7		
6 Graphs using real-life contexts	8	N5.3 Calculations and calculators	43
G5.1 Measures and mensuration	9	1 Powers of 10	43
1 Perimeter and area	9	2 Rounding and approximation	44
2 Finding π	10	3 Mental calculations with decimals	45
3 Area of a circle	11	4 Written calculations with decimals	46
4 Solving circle problems and using π	12	5 Using a calculator	47
5 Volume of prisms	13	6 Problems involving measures	48
6 Surface area of prisms	14		
N5.2 Proportional reasoning	15	S5.2 Probability 1	50
1 Adding and subtracting fractions	15	1 Simple probability	50
2 Multiplying fractions	16	2 Equally likely outcomes with two events	50
3 Dividing fractions	17	3 Mutually exclusive events	51
4 Percentage change	18	4 Practical probability experiments	52
5 Ratio	19	5 Simulating probability experiments	53
6 Direct proportion	21		
S5.1 Enquiry 1	23	A5.3 Functions and graphs	54
1 Stem-and-leaf diagrams	23	1 Generating linear graphs using ICT	54
2 Starting a statistical investigation 1	24	2 Sketching graphs	54
3 Completing a statistical investigation 1	25	3 Drawing accurate graphs	55
4 Data collection sheets	27	4 Direct proportion	56
5 Starting a statistical investigation 2	27	5 Reflecting graphs in $y = x$	57
6 Completing a statistical investigation 2	29	6 Simple quadratic graphs using ICT	58
A5.2 Equations and formulae	31	G5.3 Transformations	59
1 Multiplying out brackets	31	1 Planes of symmetry	59
2 Factorising expressions	32	2 Combined transformations	60
3 Substituting into formulae	32	3 Islamic patterns	61
4 Changing the subject of a formula	33	4 Enlargements	62
5 Solving linear equations	34	5 Enlargements in real-life applications	63
6 Trial and improvement	34	6 Length, area and volume	65

A5.4 Using algebra	66	6 Interpreting graphs	91
1 Using graphs to solve problems	66	7 Matching graphs to real-life situations	92
2 Using algebra in geometry problems	67	8 Using graphs to solve problems	93
3 Using algebra in investigations	68		
S5.3 Enquiry 2	69	S5.4 Probability 2	94
1 Calculating statistics	69	1 Theoretical and experimental probability	94
2 Line graphs for time series	70	2 Mutually exclusive events	95
3 Scatter graphs	71	3 Using experimental probability	96
4 Collecting and organising data	72	4 Choice or chance?	97
5 Analysing and representing data	74		
6 Interpreting data	75	N5.4 Solving problems	98
7 Reporting and evaluating	77	1 History of our number system and zero	98
		2 Number puzzles based on 3 by 3 grids	99
G5.4 Angles and constructions	78	3 Exploring fractions	100
1 Angles in polygons	78	4 Problems involving properties of numbers	101
2 Regular polygons	79	5 Using algebra and counter-examples	102
3 Regular polygons and the circle	80		
4 Angle problems and polygons	81	R5.1 Revision unit 1	104
5 Polygons and parallel lines	82	1 Using a calculator	104
6 Constructions	83	2 Using percentages to compare proportions	104
7 Constructing triangles	84	3 Sequences, equations and graphs	106
8 Loci	85	4 Angles and polygons	108
9 More loci	86	5 Charts and diagrams	109
A5.5 Equations, formulae and graphs	88	R5.2 Revision unit 2	111
1 Factorising	88	1 Ratio and proportion	111
2 Working with algebraic fractions	89	2 Solving number problems	113
3 Working with formulae	89	3 Expressions, equations and formulae	114
4 Forming equations	90	4 Circles and enlargements	116
5 Visualising graphs	91	5 Probability	118

TASK 1: Integer powers of numbers



Points to remember

- The number 2 raised to the power 4 is 2^4 or $2 \times 2 \times 2 \times 2$. 4 is called the **index** or **power**, and 2^4 is written in **index form**.
- To multiply numbers in index form, add the indices, so $a^m \times a^n = a^{m+n}$.
- To divide numbers in index form, subtract the indices, so $a^m \div a^n = a^{m-n}$.
- A negative number raised to an even power is positive. A negative number raised to an odd power is negative.

1 Simplify these.

a $3^9 \times 3^2$

b 2×2^5

c $11^2 \times 11^{-3}$

d $x^3 \times x^3$

e $4^5 \div 4^2$

f $10^7 \div 10^3$

g $8^4 \div 8^{-6}$

h $z^3 \div z^2$

2 Some numbers can be written as the sum of two cubes, for example:

$$152 = 5^3 + 3^3$$

Write each of these numbers as the sum of two cubes.

a 28

b 72

c 1125

3 Look at this puzzle. Each * stands for a missing digit.

$$(*2)^2 = ***$$

This has two possible solutions: $12^2 = 144$ or $22^2 = 484$.

The next possibility, $32^2 = 1024$, has too many digits on the right-hand side.

Now solve these puzzles. Write all the possible answers.

a $(*5)^2 = ***$

b $(**)^2 = **1$

c $(*)^3 = **6$

d $(**)^3 = ***7$

TASK 2: Estimating square roots

Points to remember

- \sqrt{n} is the **square root** of n .

Example $\sqrt{81} = \pm 9$

- You can find positive square roots on a calculator.

Example To find $\sqrt{81}$, press: $\boxed{8} \boxed{1} \boxed{\sqrt{}}$ or $\boxed{\sqrt{}} \boxed{8} \boxed{1}$.

Answer: 9

- $\sqrt[3]{n}$ is the **cube root** of n , for example $\sqrt[3]{125} = 5$, $\sqrt[3]{-27} = -3$.

- Some calculators have a **cube root** key $\boxed{\sqrt[3]{}}$.

Example To find $\sqrt[3]{64}$, press: $\boxed{6} \boxed{4} \boxed{\sqrt[3]{}}$ or $\boxed{\sqrt[3]{}} \boxed{6} \boxed{4}$.

Answer: 4

- For other roots there is a key like $\boxed{\sqrt[x]{}}$, or other variations.

Example To find the value of $\sqrt[5]{32}$, key in $\boxed{3} \boxed{2} \boxed{\sqrt[x]{}} \boxed{5}$.

Answer: 2

- 1 Use your calculator** to work these out.

Where appropriate, give your answer correct to two decimal places.

a $\sqrt[3]{6859}$

b $\sqrt[4]{6561}$

c $\sqrt[5]{59049}$

d $\sqrt[6]{15625}$

e $\sqrt[3]{13824}$

f $\sqrt[8]{256}$

g $\sqrt[4]{5643}$

h $\sqrt[3]{76}$

- 2** The area of this square photograph frame is 352 cm^2 .

Use trial and improvement to find the length of one side.

Give your answer to one decimal place.



- 3** Estimate the integer that is closest to the value of each of these.

a $\sqrt[3]{26}$

b $\sqrt[3]{85}$

c $\sqrt[3]{200}$

d $\sqrt[3]{900}$

