

# Contents

## Number

Special numbers	4
Multiplying & dividing by 10, 100, 1000, ...	5
Mental strategies for + and –	6
Mental strategies for $\times$ and $\div$	7
Multiples & factors	8
LCM & HCF	9
Prime numbers	10
Prime factorisation	11
Rounding	12
Fractions	14
Percentages	17
Fractions, decimals & percentages	20
Ratio & proportion	22
Negative numbers	24
Powers & roots	26
Standard index form	28
Written methods	29
Calculations with brackets	31
Checking calculations	32

## Algebra

Using letters	33
Brackets	34
Factorising expressions	35
Equations	35
Formulae & substitution	37
Rearranging formulae	38
Sequences & number patterns	39
Coordinates	41
Straight-line graphs	43
Quadratic graphs	46
Conversion graphs	47
Real-life graphs	48
Inequalities	49
Trial & improvement	50

## Shape, space & measures

Converting between measures	51
Reading scales & accuracy	52
Estimating & measuring angles	53
Angles & parallel lines	54
Polygons	55
Symmetry & properties of shapes	56
Transformations	58
Congruent & similar shapes	61
Areas of triangles & quadrilaterals	63
Area of composite shapes & perimeter	64
Circles	65
3-D shapes & nets	66
Plans & elevations	67
Volume & surface area	68
Pythagoras' theorem	70
Bearings & scale drawings	72
Compound measures	73
Constructions & loci	74

## Handling data

Mean, median, mode, range	76
Discrete & continuous data	77
Collecting data & two-way tables	78
Displaying data in frequency tables	79
Pictograms & bar charts	80
Frequency diagrams & polygons	81
Averages from frequency tables	82
Stem & leaf diagrams; line graphs	84
Pie charts	85
Scatter graphs	86
Probability	87
<i>Speedy</i> revision test	89
Answers	91
Index	95

# Calculations with brackets

## ● Order of operations

When faced with something like  $5^2 - 2 \times (7 - 3)$  you have to work out each part in the correct order, else you'll get the wrong answer.

Always do operations in this order:

Brackets	$5^2 - 2 \times (7 - 3)$
Squares	$= 5^2 - 2 \times 4$
Divide and Multiply	$= 25 - 2 \times 4$
Add and Subtract	$= 25 - 8$ $= 17$



You can remember the order of operations with the word **BIDMAS**.

**B**rackets, then **I**ndices, **D**ivision, **M**ultiplication, **A**ddition, **S**ubtraction.  
(‘Indices’ is the fancy word for squares, cubes, etc.)

If there are several multiplications and divisions (or additions and subtractions) do them one at a time from left to right.

For example:

$$\begin{aligned} 24 \div 6 \div 2 \\ = 4 \div 2 \\ = 2 \end{aligned} \quad \checkmark$$

Not:

$$\begin{aligned} 24 \div 6 \div 2 \\ = 24 \div 3 \\ = 8 \end{aligned} \quad \times$$

To make it clear it would be better to write this with brackets as  $(24 \div 6) \div 2$ .

## ● Brackets on a calculator

Use the bracket buttons, **( )**, on your calculator exactly where they appear in a calculation. For  $72 - (18 + 36)$  press:

**7 2 - ( 1 8 + 3 6 ) =** to get 18.

Look out for sneaky brackets:

$\frac{16-10}{2}$  is really  $(16 - 10) \div 2$ , so you have to use brackets.

Press: **( 1 6 - 1 0 ) ÷ 2 =** ✓

Not: **1 6 - 1 0 ÷ 2 =** ✗

Work these out on paper. Check your answers on a calculator.

a  $3 \times 5 - 2 \times 4$     b  $2.8 \times (15 - 2)$     c  $56 \div 4 \div 2$     d  $\frac{28}{11+3}$

TEST

# Averages from frequency tables (1)

## ● Finding the median, mode, range

The frequency table shows the number of pets owned by 19 people.

No. of pets	Frequency
0	2
1	6
2	4
3	7
<b>Total</b>	<b>19</b>

The first 2 people have 0 pets, the next 6 have 1 pet, ...

The median is the number of pets owned by the 10th person. **Median = 2 pets**

The mode is the number of pets with the highest frequency. **Mode = 3 pets**

**Range = 3 – 0 = 3 pets**

## ● Finding the mean

### ► Q & A

Find the mean number of cars per household.

No. of cars	Frequency
0	6
1	11
2	29
3	4



### Answer

Add an extra column to the table to record the 'No. of cars × Frequency'.

No. of cars	Frequency	No. of cars × Freq.
0	6	0
1	11	11
2	29	58
3	4	12
<b>Totals</b>	<b>50</b>	<b>81</b>

$0 \times 6 = 0$

29 houses have 2 cars. That's  $2 \times 29 = 58$  cars.

There are 81 cars at the 50 houses.

Mean =  $81 \div 50 = 1.62$  cars per household

Look at the 'No. of pets' table above.

1 Calculate the mean number of pets.

Look at the 'No. of cars' table in the Q & A.

2 What is the median number of cars per household?

3 What is the modal number of cars?