



- Knowing mental strategies for working out calculations
- Knowing mental strategies for solving problems involving fractions, decimals and percentages
- Estimating the square roots of non-square numbers
- Estimating the answer to calculations by rounding

You should know

explanation 1b

a $55 + 42$ **b** $62 + 35$ **c** $81 + 16$ **d** $143 + 36$
e $351 + 28$ **f** $475 + 38$ **g** $1726 + 77$ **h** $2326 + 1685$

a $76 - 54$ **b** $81 - 24$ **c** $197 - 63$ **d** $156 - 87$
e $572 - 98$ **f** $820 - 342$ **g** $382 - 165$ **h** $2460 - 159$

- a** Seven pens costing 48p each and paid for using a £5.00 note.
- b** A rubber costing 37p and a ruler costing 54p paid for using a £1.00 coin.
- c** A magazine costing £1.70 and a newspaper costing 63p paid for using a £5.00 note.
- d** Some fruit costing £2.68 and some flowers costing £3.75 paid for using a £10.00 note.
- e** Food costing £38.72 and paid for using a £50.00 note.
- f** A service for a car costing £129.25 and paid for using three £50.00 notes.



explanation 2

4 Work out these multiplications mentally.

- | | | | |
|----------------------------|----------------------------|----------------------------|----------------------------|
| a 27×0.2 | b 55×0.3 | c 72×0.4 | d 125×0.02 |
| e 320×0.04 | f 410×0.05 | g 228×0.02 | h 820×0.04 |

5 a A child's moneybox contains thirty-six 20p coins.

How much money, in pounds, is this?

b A biro cost 40p. Calculate the cost, in pounds, of buying sixty biros.

c A sausage machine produces one hundred and twenty sausages each hour. Each sausage is 8 cm long.

Calculate the total length, in metres, of sausages produced in these times.

i 1 hour **ii** 8 hours

d A child's footprint is 15 cm long. Calculate the total distance, in metres, walked after two hundred and eighty footsteps when she walks so that her footsteps lie end to end.

explanation 3

6 Work out these multiplications mentally.

- | | | | |
|-------------------------|--------------------------|--------------------------|-------------------------|
| a 23×11 | b 16×11 | c 32×12 | d 45×19 |
| e 65×19 | f 125×29 | g 140×51 | h 23×99 |

7 Work these out.

a The total number of pupils in 22 classes of 31 pupils each.

b The area of a rectangle 32 cm long and 19 cm wide.

c The area of a square garden of edge length 29 m.

d The number of chairs in a hall, when there are 29 rows and 15 chairs in each row.

8 Work these out mentally.

- | | | |
|------------------------------|--------------------------------------|-----------------|
| a $220 + 6 \times 19$ | b $39 \times 8 - 71 \times 3$ | c 49^2 |
|------------------------------|--------------------------------------|-----------------|

- 9** 59 people pay £19.99 each to go on a coach trip.

Work out mentally how much they pay altogether.



explanation 4

- 10** Work these out mentally.

a $930 \div 15$

b $612 \div 12$

c $504 \div 18$

d $288 \div 9$

e $720 \div 120$

f $1155 \div 21$

g $784 \div 28$

h $2688 \div 24$

i $207 \div 1.8$

j $155 \div 2.5$

k $119 \div 0.35$

l $22.56 \div 0.16$

- 11** Work these out.

- a** 810 people are split equally into 15 groups.

How many people are there in each group?

- b** A lottery win of £115 680 is shared equally by a syndicate of 12 people.

How much does each person receive?

- 12** Rob can walk 2.6 miles in an hour. He is planning an 11.7 mile walk. Without using a calculator, work out how long it will take him to complete the walk.



explanation 5a

explanation 5b

explanation 5c

13 Copy and complete these tables without using a calculator.

Decimal	Fraction	Percentage
	$\frac{1}{2}$	
0.25		
0.333...		
	$\frac{1}{10}$	
		20%
0.666...		
	$\frac{3}{4}$	

Decimal	Fraction	Percentage
	$\frac{1}{8}$	
	$\frac{5}{8}$	
		80%
		150%
1.2		
	$\frac{29}{20}$	
	$\frac{5}{2}$	

14 Work these out mentally.

a 50% of 40

b 25% of 80

c $\frac{1}{10}$ of 120

d $\frac{3}{10}$ of 120

e 0.1 of 70

f 0.4 of 70

g 60% of 70

h $\frac{2}{3}$ of 93

i $\frac{1}{8}$ of 248

j $\frac{5}{8}$ of 248

k 120% of 50

l 160% of 90

m 240% of 60

n 175% of 100

o 2% of 110

p 105% of 6

15 Work these out without using a calculator.

a In a school of 320 pupils 45% are girls. How many girls are there?

b In a typical family, $\frac{3}{8}$ of income is spent on food. Calculate how much is spent on food by a family with a monthly income of £1200.

c In a survey of 450 earthworms, it was found that 36% were over 6 cm in length. How many earthworms in the survey were over 6 cm long?

d Due to high demand, a shop decides to increase the price of one of its games consoles by 11%.
If the original price was £180, calculate the new selling price.

e Better Books decides to reduce the price of its books by $\frac{1}{3}$.
What is the new price of a book that was originally selling for £24.90?

explanation 6

- 16** Use estimation to match the value of each square root to a number in the box.

a $\sqrt{5}$	b $\sqrt{24}$	c $\sqrt{84}$
d $\sqrt{108}$	e $\sqrt{77}$	f $\sqrt{2}$
g $\sqrt{150}$	h $\sqrt{410}$	i $\sqrt{34}$

9.2	8.8	4.9
10.4	20.2	5.8
12.2	2.2	1.4

- 17** Use your answers to question **16** to help find the approximate length of the side of a square with each area.

a Area = 34 cm^2	b Area = 108 m^2	c Area = 5 m^2
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explanation 7a

explanation 7b

- 18** Estimate the answer to each calculation, showing your method clearly.

a 62×39	b 71×48	c 321×148
d $242 \div 62$	e $389 \div 47$	f $\frac{12 \times 31}{5}$
g $\frac{189 \times 211}{8}$	h $8 \times \sqrt{17}$	i $\sqrt{52} \times \sqrt{14}$
j $\frac{\sqrt{15} \times 89}{4}$	k $\frac{\sqrt{125} \times \sqrt{67}}{\sqrt{15}}$	l $23^2 \times \sqrt{6}$
m $\frac{31^2}{9 \times \sqrt{105}}$	n $19^2 \times 41^2 \times \sqrt{10}$	o $\left(\frac{1}{3}\right)^2 \times 385$

- 19** Sean estimates the value of $\frac{36 \times 29}{0.7}$ using $\frac{40 \times 30}{0.5}$.

- Find the value of Sean's estimate.
Is this larger or smaller than the true value?
- Find a way to improve on Sean's estimate and work it out.
- Use a calculator to find the true value to the nearest whole number.