Planner

# Mental methods (2)

- Learning mental strategies for adding, subtracting, multiplying and dividing
- Estimating the answer to calculations by rounding
- Estimating the square roots of non-square numbers
- Converting between fractions, decimals and percentages
- Learning mental strategies for solving problems involving fractions, decimals and percentages, without a calculator

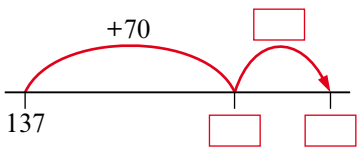
Keywords

You should know

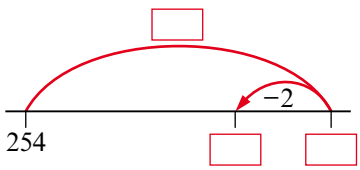
explanation 1a explanation 1b

**1** Copy these diagrams and fill in the missing values.

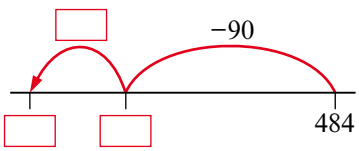
**a** 137 + 74 = 137 + 70 + 4 = ☐



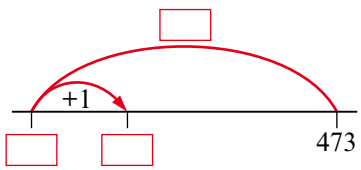

**b** 254 + 48 = 254 + ☐ − 2 = ☐




**c** 484 − 93 = 484 − 90 − ☐ = ☐




**d** 473 − 139 = 473 − ☐ + 1 = ☐




**2** Work out these sums mentally.

| | | | |
|---|---|---|---|
| **a** 18 + 17 | **b** 34 + 97 | **c** 19 + 16 | **d** 43 + 368 |
| **e** 151 + 28 | **f** 273 + 88 | **g** 529 + 277 | **h** 226 + 634 |

**3** Work out these subtractions mentally.

| | | | |
|---|---|---|---|
| **a** 76 − 54 | **b** 84 − 21 | **c** 97 − 63 | **d** 156 − 22 |
| **e** 572 − 68 | **f** 820 − 314 | **g** 382 − 165 | **h** 246 − 159 |

**4** Calculate each of these.

**a** 22 + 38 **b** 67 − 13 **c** 41 + 32 **d** 94 − 73

**5** Work these out.

**a** 44 + 81 **b** 51 + 129 **c** 77 – 35 **d** 39 + 32

**e** 65 – 56 **f** 400 – 324 **g** 324 + 406 **h** 463 – 451

**6** Work out the total cost of these items.

**a** A book for £8 and a DVD for £17.

**b** A pair of jeans for £31 and a jacket for £57.

**c** A pair of trainers for £88 and a mobile phone for £125.

**7** Pete wants to buy a jumper costing £24. He has a voucher which will save him £5. How much money will he pay?

**8** Work out the change for each item without using a calculator.

**a** A pen costing 48p and paid for using a £2.00 coin.

**b** A chocolate bar costing 37p and paid for using a £1.00 coin.

**c** A magazine costing £1.70 and paid for using a £5.00 note.

**9** Keira is driving from London to Edinburgh. Her journey is 405 miles. She has driven 231 miles. How many more miles does she have to drive?

explanation 2a explanation 2b online

**10** Copy and complete these calculations.

**a** $5 \times 14 = 5 \times (10 + \square)$
$= 5 \times \square + 5 \times \square$
$= \square + \square$
$= \square$

**b** $7 \times 23 = 7 \times (\square + \square)$
$= 7 \times \square + 7 \times \square$
$= \square + \square$
$= \square$

**c** $6 \times 12 = 6 \times 6 \times \square$
$= \square \times \square$
$= \square$

**d** $9 \times 14 = 9 \times \square \times \square$
$= \square \times \square$
$= \square$

**11** Work these out without using a calculator.

**a** $8 \times 13$ **b** $11 \times 26$ **c** $25 \times 16$ **d** $15 \times 24$

**12** Maria is trying to work out $23 \times 4$. She writes $(20 \times 3) \times 4 = 240$.
Explain what she has done wrong. What is the correct answer?

**13** Copy and complete these calculations.

**a** $9 \times 0.9 = 9 \times (0.1 \times \square)$
$= (9 \times \square) \times 0.1$
$= \square \times 0.1$
$= \square$

**b** $15 \times 0.5 = 15 \times (\square \times \square)$
$= (15 \times \square) \times \square$
$= \square \times \square$
$= \square$

**14** Work these out. Use factors to help you.

**a** $10 \times 0.4$ **b** $12 \times 0.2$ **c** $23 \times 0.3$ **d** $5 \times 0.7$

**15** **a** Alison has thirty-six 20p coins.
How much money, in pounds, does she have?

**b** One biro costs 40p. Calculate the cost, in pounds, of buying sixty biros.

explanation 3 — online

**16** Work these out mentally.

**a** $23 \times 11$ **b** $16 \times 11$ **c** $32 \times 12$ **d** $45 \times 19$

**e** $65 \times 19$ **f** $25 \times 12$ **g** $14 \times 18$ **h** $23 \times 19$

**17** A football kit costs £60.
How much would it cost to kit out a full team of 11 players?

**18** 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.

area = length × width

**c** The area of a square garden with edges of length 21 m.

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

**19** Work these out without using a calculator.

**a** $123 \times 11$ **b** $114 \times 12$ **c** $203 \times 11$ **d** $222 \times 19$

explanation 4

**20** Work these out mentally. Use factor pairs to help you.

**a** $75 \div 15$ **b** $132 \div 12$ **c** $54 \div 18$ **d** $680 \div 20$

**e** $360 \div 30$ **f** $840 \div 40$ **g** $4800 \div 120$ **h** $264 \div 24$

**i** $550 \div 25$ **j** $234 \div 18$ **k** $147 \div 21$ **l** $256 \div 16$

**21** Work these out.

**a** 810 pupils are split equally into 15 groups.
How many pupils are there in each group?

**b** A postman has 360 letters to deliver equally to 45 houses.
How many letters does each house receive?

**c** 216 kg of flour is shared equally amongst 24 families.
How much flour does each family receive?

explanation 5 online

**22** Estimate the answer to each calculation. Show your method clearly.

**a** $62 \times 39$ **b** $71 \times 48$ **c** $108 \times 99$ **d** $32 \times 38$

**e** $57 \times 41$ **f** $321 \times 148$ **g** $43 \times 188$ **h** $333 \times 248$

**23** Estimate the answer to each calculation. Show your method clearly.

**a** $242 \div 62$ **b** $389 \div 47$ **c** $158 \div 19$ **d** $447 \div 23$

**e** $898 \div 149$ **f** $187 \div 24$ **g** $\frac{12 \times 31}{2}$ **h** $\frac{189 \times 211}{8}$

**24** Work these out. Use estimation to help you.

**a** Lady Grey's School football pitch is 103 metres long and 67 metres wide. Approximately what is the area of the pitch?

**b** A theatre ticket costs £33. About how much would it cost for a class of 27 pupils to attend the theatre performance?

**c** A bottle of squash makes 16 glasses of drink. About how many bottles are needed for a party of 239 children so each child gets one glass to drink?

explanation 6

**25** Use estimates to match the value of each square root to a number in the box.

| 9.1 | 8.8 | 4.9 | 10.4 | 3.5 | 20.2 | 5.8 | 12.2 | 2.2 | 1.4 |
|---|---|---|---|---|---|---|---|---|---|

**a** $\sqrt{5}$ **b** $\sqrt{24}$ **c** $\sqrt{84}$ **d** $\sqrt{108}$ **e** $\sqrt{77}$

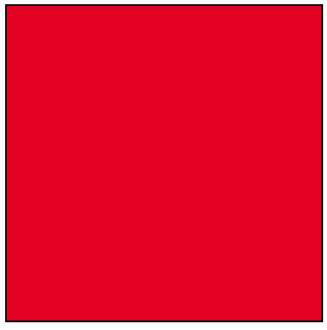
**f** $\sqrt{2}$ **g** $\sqrt{150}$ **h** $\sqrt{410}$ **i** $\sqrt{34}$ **j** $\sqrt{12}$

**26** Write the approximate length of the side of a square with each area. Use your answers to question **25** to help you.

**a**

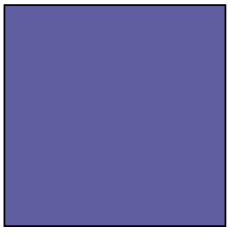
Area = 34 cm$^2$

**b**



Area = 108 m$^2$

**c**



Area = 5 m$^2$

explanation 7a | explanation 7b | online

**27** Work these out without using a calculator.

**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** 150% of 6

**28** Copy the table. Complete without using a calculator.

| Decimal | Fraction | Percentage |
|---|---|---|
| 0.5 | $\frac{1}{2}$ | |
| 0.25 | | 25% |
| | $\frac{1}{10}$ | |
| | | 20% |
| | $\frac{3}{4}$ | |
| 0.125 | $\frac{1}{8}$ | |
| | $\frac{3}{8}$ | |
| | | 80% |
| 1.5 | | 150% |
| 1.2 | | |
| | $\frac{145}{100}$ | |
| | $\frac{5}{2}$ | |