



# Unit 2: Four operations (I)

## Lesson 1: Problem solving – using written methods of addition and subtraction (I)

→ pages 29–31

1.

	Th	H	T	O
	3	2	1	4
+		5	6	4
	3	7	7	8

2. Numbers from left to right along number line: 21,310; 21,312; 21,322  
 $25,322 - 4,012 = 21,310$

3. a) 1,141

	HTh	TTh	Th	H	T	O
	1	0	1	5	7	3
-	1	0	0	4	3	2
	0	0	1	1	4	1

b) 274,579

	HTh	TTh	Th	H	T	O
	2	3	4	5	0	1
+		4	0	0	7	8
	2	7	4	5	7	9

4. a)  $2,438 - 1,330 = 1,108$   
 She flew 1,108 km further on Monday than on Tuesday.
- b)  $2,438 - 227 = 2,211$   
 $2,438 + 1,330 + 2,211 = 5,979$   
 She flew 5,979 km in total.
5. Max has added in the hundreds column instead of subtracting. In the ten thousands column, Max thinks that 2 take away 0 is 0. The correct answer is 23,048.

6.

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7. a) 9,090,909  
 b) 969,499

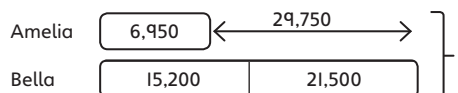
### Reflect

The missing number is 53,305. Problems will vary. Encourage children to write a story where the unknown is the part that was taken away from the whole of 74,505 to leave 21,200 behind.

## Lesson 2: Problem solving – using written methods of addition and subtraction (2)

→ pages 32–34

1. a)  $14,321 - 1,234 = 13,087$   
 b) Methods may vary, for example:  
 $14,321 - (1,234 + 9,876) = 3,211$  or  
 $13,087 - 9,876 = 3,211$   
 c)  $1,234 - 909 = 325$ ;  $9,876 - 909 = 8,967$ ;  
 $14,321 - 909 = 13,412$
2. 6 years. Methods may vary – encourage children to use mental strategies of counting on or back, which they can show on a number line.
3. C = 18,186  
 Total =  $7,614 + 12,900 + 18,186 = 38,700$   
 Alternatively, since B is mid-way, it is the average of the three numbers so the total is  $3 \times 12,900$ , which is 38,700.
4. a) 3,087  
 b) 6,419,754
5.  $15,200 + 21,500 - 29,750 = 6,950$   
 $15,200 + 21,500 + 6,950 = 43,650$



They scored 43,650 points altogether.

### Reflect

Explanations may vary – encourage children to explain that both numbers have decreased by 1, meaning that the difference remains the same. However, the calculation has become simpler as there is no longer any exchange needed in the calculation.

$5,000 - 1,728 = 4,999 - 1,727 = 3,272$   
 $50,000 - 26,304 = 49,999 - 26,303 = 23,696$

## Lesson 3: Multiplying numbers up to 4 digits by a 1-digit number

→ pages 35–37

1. a)  $3 \times 2,324 = 6,972$   
 $2,324 + 2,324 + 2,324 = 6,972$   
 $6,000 + 900 + 60 + 12 = 6,972$   
 b)  $2,153 \times 5 = 10,765$
- |   |        |     |     |    |
|---|--------|-----|-----|----|
|   | 2,000  | 100 | 50  | 3  |
| 5 | 10,000 | 500 | 250 | 15 |
- c)  $5,203 \times 6 = 31,218$   
 d)  $7 \times 1,593 = 11,151$



2.  $3,050 \times 6 = 18,300$
3. a)  $251 \times 7 = 1,757$   
 b)  $1,251 \times 7 = 8,757$   
 c)  $1,251 \times 8 = 10,008$
4. a)  $2 \times 5,500 = 11,000$ ;  $11,000 + 1,350 = 12,350$   
 The total mass of the boxes is 12,350 g.  
 b)  $1,350 \times 5 = 6,750$   
 The total mass of the boxes is 6,750 g.  
 c)  $5,500 \times 3 = 16,500$ ;  $1,350 \times 3 = 4,050$ ;  
 $16,500 + 4,050 = 20,550$   
 Alternative method:  $5,500 + 1,350 = 6,850$ ;  
 $6,850 \times 3 = 20,550$   
 The total mass of the boxes is 20,550 g.
5. a) Answers will vary. Ensure that children have taken the smaller product from the larger product to find the difference.  
 b) Biggest number =  $8,765 \times 9 = 78,885$   
 Smallest number =  $6,789 \times 5 = 33,945$

### Reflect

Explanations may vary. Encourage children to notice the link between multiplying out each column in the short multiplication and where the answer is found on the grid method, for example: The 12,000 in the grid method can be seen as 1 ten thousand and 2 thousands in the column method. The 150 and 21 in the grid method combine in the column method to show 171 as 1 hundred, 7 tens and 1 one.

## Lesson 4: Multiplying numbers up to 4 digits by a 2-digit number

→ pages 38–40

1. a)  $3,125 \times 15 = 46,875$

$$\begin{array}{r}
 \phantom{0}3 \phantom{0}1 \phantom{0}2 \phantom{0}5 \\
 \times \phantom{0}1 \phantom{0}5 \\
 \hline
 \phantom{0}2 \phantom{0}5 \phantom{0}0 \phantom{0}0 \phantom{0}0 \phantom{0}0 \phantom{0}0 \\
 \phantom{0}1 \phantom{0}0 \phantom{0}0 \phantom{0}0 \phantom{0}0 \phantom{0}0 \phantom{0}0 \\
 \phantom{0}5 \phantom{0}0 \phantom{0}0 \phantom{0}0 \phantom{0}0 \phantom{0}0 \phantom{0}0 \\
 \phantom{0}1 \phantom{0}5 \phantom{0}0 \phantom{0}0 \phantom{0}0 \phantom{0}0 \phantom{0}0 \\
 \hline
 \phantom{0}5 \phantom{0}0 \phantom{0}0 \phantom{0}0 \phantom{0}0 \phantom{0}0 \phantom{0}0 \\
 \phantom{0}2 \phantom{0}0 \phantom{0}0 \phantom{0}0 \phantom{0}0 \phantom{0}0 \phantom{0}0 \\
 \phantom{0}1 \phantom{0}0 \phantom{0}0 \phantom{0}0 \phantom{0}0 \phantom{0}0 \phantom{0}0 \\
 \phantom{0}3 \phantom{0}0 \phantom{0}0 \phantom{0}0 \phantom{0}0 \phantom{0}0 \phantom{0}0 \\
 \hline
 \phantom{0}4 \phantom{0}6 \phantom{0}8 \phantom{0}7 \phantom{0}5
 \end{array}$$

	3,000	100	20	5
10	30,000	1,000	200	50
5	15,000	500	100	25

- b)  $5,123 \times 13 = 66,599$

	5,000	100	20	3
10	50,000	1,000	200	30
3	15,000	300	60	9

$$\begin{array}{r}
 \phantom{0}5 \phantom{0}1 \phantom{0}2 \phantom{0}3 \\
 \times \phantom{0}1 \phantom{0}3 \\
 \hline
 \phantom{0}5 \phantom{0}1 \phantom{0}2 \phantom{0}3 \phantom{0}0 \\
 \phantom{0}6 \phantom{0}6 \phantom{0}5 \phantom{0}9 \phantom{0}9 \\
 \hline
 \phantom{0}6 \phantom{0}6 \phantom{0}5 \phantom{0}9 \phantom{0}9
 \end{array}$$

- c)  $1,972 \times 24 = 47,328$

2. a)  $365 \times 24 = 8,760$   
 There will be 8,760 hours in 2021.  
 b)  $3,600 \times 24 = 86,400$   
 There are 86,400 seconds in a day.
3. Column multiplication showing:  
 $5,056 \times 7 = 35,392$ ;  $35,392 \times 2 = 70,784$ ;  
 $5,056 \times 14 = 70,784$   
 An explanation that  $2 \times 7 = 14$  so you can first multiply 5,056 by 7 and then the answer by 2 and this will give the same answers as  $5,056 \times 14$ .
4.  $17 \times 379 = 6,443$   
 The pool has 6,443 litres of water in it, so it is not full.
5.  $3,629 \times 55 = 199,595$

### Reflect

Reasoning may vary, for example:

$1,254 \times 21 = 26,334$ ;  $2,508 \times 11 = 27,588$  so  $2,508 \times 11$  is larger.

$2,508 \times 11 = 1,254 \times 2 \times 11 = 1,254 \times 22$ , which is larger than  $1,254 \times 21$  so  $2,508 \times 11$  is larger.

## Lesson 5: Dividing numbers up to 4 digits by a 2-digit number (I)

→ pages 41–43

- 1.

$$6 \overline{) 1536} = 256$$

10	5	1
160	80	16

$$16 \overline{) 256} = 16$$

100	20
6,000	1,200

$$16 \overline{) 3600} = 225$$

200	50	6
1,200	300	36

$$60 \overline{) 7200} = 120$$

200	20	5
3,200	320	80

2. a)  $759 \div 33 = 23$   
 b)  $2,954 \div 14 = 211$



3.  $3,500 \div 25 = 140$ . Max can use 140 g of guinea pig food per day.
4. a)  $468 \div 9 = 52$   
 b)  $4,689 \div 9 = 521$   
 c)  $378 \div 18 = 21$   
 d)  $3,798 \div 18 = 211$

5. 
$$\begin{array}{r} 0313 \\ 22 \overline{) 6886} \end{array}$$
 
$$\begin{array}{r} 0314 \\ 21 \overline{) 6594} \end{array}$$

$6,886 \div 22 = 313$        $6,594 \div 21 = 314$

**Reflect**

$1,887 \div 17 = 111$

Methods may vary. Children could use short division or the inverse grid method. Some children may already have an idea of the 'chunking' or 'partitioning' method and could show these too.

**Lesson 6: Dividing numbers up to 4 digits by a 2-digit number (2)**

→ pages 44–46

1. a)  $3,500 \div 7 = 500$   
 $500 \div 2 = 250$   
 $3,500 \div 14 = 250$   
 There is 250 ml of juice in each glass.
- b)  $360 \div 6 = 60$   
 $60 \div 4 = 15$   
 Aki can make 15 clay shells.
2.  $1,260 \div 10 = 126$ ;  $126 \div 2 = 63$ ;  $1,260 \div 20 = 63$   
 $180 \div 3 = 60$ ;  $60 \div 5 = 12$ ;  $180 \div 15 = 12$   
 $960 \div 2 = 480$ ;  $480 \div 8 = 60$ ;  $960 \div 16 = 60$   
 $1,100 \div 11 = 100$ ;  $100 \div 2 = 50$ ;  $1,100 \div 22 = 50$  or  
 $1,100 \div 2 = 550$ ;  $550 \div 11 = 50$ ;  $1,100 \div 22 = 50$
3. a) Factors may vary.  $2,700 \div 18 = 150$   
 b) Factors may vary.  $7,200 \div 12 = 600$   
 c) Factors may vary.  $5,400 \div 36 = 150$   
 d) Dividing by factors 7 and 2 (in either order)  
 $5,600 \div 14 = 400$
4. a) i)  $480 \div 8 = 60$   
 $60 \div 2 = 30$   
 So,  $480 \div 16 = 30$   
 ii)  $960 = 480 \times 2$  and  $32 = 2 \times 16$   
 Therefore,  $960 \div 32 = 480$  multiplied by 2, divided by 2 and divided by 16.  
 Multiplying by 2 and dividing by 2 are inverse operations so will cancel each other out.  
 So  $960 \div 32 = 480 \div 16 = 30$   
 b) Ambika is correct – encourage children to prove this using an example or by drawing a diagram, for example:  
 $160 \div 4 = 40$  and  $160 \div 8 = 20$ . This means that if I double the divisor, the quotient is halved.  
 Bella is incorrect – encourage children to disprove

using an example or a diagram, for example:  
 $160 \div 4 = 40$  and  $320 \div 8 = 40$ . This means that if I double both the dividend and divisor, the quotient remains the same.

**Reflect**

$6,440 \div 20 = 322$

Methods may vary, for example:  
 $6,440 \div 2 = 3,220$ ;  $3,220 \div 10 = 322$   
 $6,440 \div 5 = 1,288$ ;  $1,288 \div 4 = 322$

**Lesson 7: Dividing numbers up to 4 digits by a 2-digit number (3)**

→ pages 47–49

1. a)  $399 \div 19 = 21$

$$\begin{array}{r} 10 \quad 10 \quad 1 \\ 19 \overline{) 399} \\ \underline{190} \phantom{0} \\ 190 \phantom{0} \\ \underline{190} \\ 0 \end{array}$$

- b)  $385 \div 11 = 35$   
 c)  $888 \div 37 = 24$

2.  $992 \div 31 = 32$   
 There are 32 classes.

3. a)  $182 \div 13 = 14$       c)  $528 \div 11 = 48$   
 b)  $364 \div 13 = 28$       d)  $528 \div 22 = 24$

4. Answers may vary.

Mo could have done:

$$\begin{array}{r} 3 \quad 3 \\ 37 \overline{) 740} \\ \underline{740} \\ 0 \end{array}$$

Olivia could have done:

$$\begin{array}{r} 3 \quad 3 \\ 37 \overline{) 740} \\ \underline{370} \phantom{0} \\ 370 \phantom{0} \\ \underline{370} \\ 0 \end{array}$$

5.  $702 \div 26 = 27$



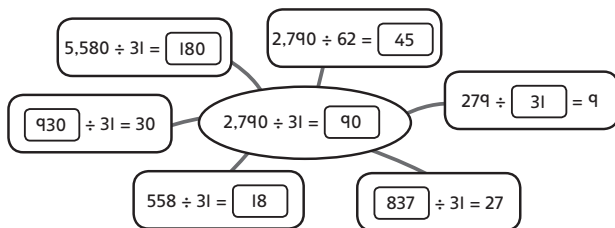
**Reflect**

Answers may vary – encourage children to check the answer using the inverse calculation of  $23 \times 24$ .

**Lesson 8: Dividing numbers up to 4 digits by a 2-digit number (4)**

→ pages 50–52

- $735 \div 15 = 49$
  - $1,890 \div 15 = 126$
  - $5,610 \div 15 = 374$
- $1,331 \div 11 = 121$   
There will be 121 teams.
- $2,444 \div 26 = 94$ , Jen cycles 94 km per day.  
 $2,325 \div 25 = 93$ , Toshi cycles 93 km per day.  
Jen cycles more kilometres per day than Toshi.
- I know that  $10 \times 61 = 610$ , not 620. Ebo has made a mistake at  $7 \times 61$ , as it should be 427, not 437.  
Number line corrections: 427, 488, 549, 610
  - $8,845 \div 61 = 145$
- $2,790 \div 31 = 90$



**Reflect**

$2,553 \div 23$  circled. Explanations may vary – encourage children to notice that 23 is a prime number so there are no useful factors to divide by to make the calculation easier.

$1,440 \div 30 = 48$   
 $2,553 \div 23 = 111$

**Lesson 9: Dividing numbers up to 4 digits by a 2-digit number (5)**

→ pages 53–55

- Aki is correct.  
 $100 \div 13 = 7$  remainder 9  
Emma:  $100 \div 14 = 7$  remainder 2  
Aki:  $101 \div 13 = 7$  remainder 10
- $200 \div 15 = 13$  remainder 5  
Andy can fill up 13 pages and will have 5 stickers left over.

- Lines drawn to match calculations to remainders:

$450 \div 20 \rightarrow 10$   
 $301 \div 10 \rightarrow 1$   
 $955 \div 50 \rightarrow 5$   
 $685 \div 25 \rightarrow 10$   
 $335 \div 33 \rightarrow 5$

- $300 \div 11 = 27$  remainder 3
  - $300 \div 31 = 9$  remainder 21
  - $750 \div 17 = 44$  remainder 2
  - $850 \div 17 = 50$
- $475 \div 35 = 13$  remainder 20  
The ranger needs to buy 14 bags of seeds.
- Answers will vary. Encourage children to use their knowledge of multiples to solve this. The missing number can be 1 less than any multiple of 41. This will always leave a remainder of 40. For example:  $41 \times 10 = 410$ , so  $409 \div 41 = 9$  remainder 40

**Reflect**

Explanations may vary. Encourage children to use Reena’s method and then check if  $300 \div 21$  has a remainder of 2. Reena is incorrect although her calculation is correct i.e.  $300 \div 3 = 100$ ; then  $100 \div 7 = 14$  remainder 2. However, this remainder as a fraction is  $\frac{2}{7}$  and if you use equivalence and link it back to the original divisor,  $\frac{2}{7} = \frac{6}{21}$ . There the remainder is 6 and not 2.

**Lesson 10: Dividing numbers up to 4 digits by a 2-digit number (6)**

→ pages 56–58

- $2,000 \div 75 = 26$  remainder 50  
Amelia can make 26 ice lollies. She will have 50 ml of juice left.
  - $2,500 \div 95 = 26$  remainder 30  
Bella has 30 ml of juice left, which is less than Amelia.
  - Amelia can make  $\frac{50}{75}$  or  $\frac{2}{3}$  of an ice lolly with her remaining juice.  
Bella can make  $\frac{30}{95}$  or  $\frac{6}{19}$  of an ice lolly with her remaining juice.
- $1,000 \div 11 = 90$  remainder 10
  - $2,000 \div 11 = 181$  remainder 9
  - $4,000 \div 22 = 181$  remainder 18
  - $8,000 \div 22 = 363$  remainder 14

Answers will vary, for example:  
 $2,000 \div 11 = (2 \times 1,000) \div 11$ . The answer will therefore be  $2 \times 90$  with a remainder of  $2 \times 10$ . However, it does not make sense to have a remainder of 20 when dividing by 11. Instead this gives 1 more group of 11 with a remainder of 9. So,  $2,000 \div 11 = 181$  remainder 9.



3.  $2,515 \div 20 = 125$  remainder 15  
 So, working out the division exactly gives  
 $125 \frac{15}{20}$  or  $125 \frac{3}{4}$ .  $\frac{3}{4}$  of £1 is 75p or £0.75  
 Each class gets £125.75.
4. Answers may vary. Encourage a systematic approach –  
 make the divisor the largest possible number so that  
 you can make larger remainders.  
 $1,137 \div 95 = 11$  remainder 92

### Reflect

Answers will vary. Encourage children to work out a division equation that leaves a remainder of 10 first. They can then use this equation to create the story problem.

Encourage children to use multiplication to find a division calculation which will have a remainder of 10, for example:  $35 \times 20 = 700$ . Therefore  $700 \div 35 = 20$  so  $710 \div 35 = 20$  remainder 10.

## End of unit check

→ pages 59–60

### My journal

Answers will vary. Encourage children to use their number sense (in this case, knowing the patterns in multiples of 25) to help them find an equation that leaves a remainder of 10 when divided by 25.

### Power puzzle

Children should find that, whatever numbers they begin with, they eventually find themselves 'stuck', constantly using and reusing the digits 6, 1, 4, 7.