> Learner's Book answers

Unit 1 Getting started

1   −7, −5, 0, 3, 6, 9

2   9, 18, 27, 36, 45

3   1, 3, 5, 15

4   5^2

Exercise 1.1

1   **a** 1   **b** −4   **c** −8   **d** 4

2   **a** −6   **b** 8   **c** −10   **d** 2

3   **a** −2   **b** 10   **c** 2   **d** −10

4   **a** 4   **b** −2   **c** −10   **d** −6

5   −9

6   **a** For example: 1 and 0; 2 and −1; 3 and −2; 4 and −3; 5 and −4

   b One integer will be positive and the other integer will be zero or negative. If you ignore the − sign, the difference between them is 1 and the − sign is on the smaller integer.

7   **a** Learners could check this with some particular values for the two integers. They could use one positive integer and one negative integer or they could make them both negative integers.

   b Only if the answer is zero, otherwise they have different signs.

8

+	−4	6	−2
3	−1	9	1
−5	−9	1	−7

9   Missing numbers from top to bottom.

   a −6, −4   **b** −3, −5, 2

   c −12, −2, −10   **d** 1, 5, −4

   e −1, 7, −8

Reflection: You have to work backwards from the answer or do a subtraction.

10 **a** 5   **b** −12   **c** 10   **d** −19

11 **a** −40   **b** −130   **c** 1200   **d** −700

12 **a** **i** −4   **ii** −4

       iii −4   **iv** −4

   b Three numbers can be added in any order. It is true for any three integers.

13 **a**

+	−5	7
4	−1	11
−3	−8	4

   b $-1+11+-8+4=6$

   c $4+-3+-5+7=3$

   d $\mathbf{b}=2\times\mathbf{c}\ (6=2\times3)$

Reflection: Learner's own answer.

14 **a** There are three possible answers. They are 2, −13 and 17.

   b Learner's own check.

Exercise 1.2

1   **a** −6   **b** −35

   c −40   **d** −36

2   **a** −5   **b** −5   **c** −6   **d** −3

3   **a** −2   **b** −6   **c** 7   **d** 5

4   **a** 4   **b** −2

   c −16   **d** −20

5   There are four possible pairs: 2 and −5; −2 and 5; 1 and −10; −1 and 10.

Reflection: First, find all the pairs of numbers with a product of 10. Then think about if the sign is positive or negative.

6

×	−3	−5
5	−15	−25
7	−21	−35

7 a −21 b −50 c −8 d −4

8 a −200 b −1800 c −360 d −100

9 a −12 b −24

   c −30 d −20

10 a The missing numbers are: −5, −4, −2.

   b Add −20 ÷ 1 = −20 and −20 ÷ 20 = −1.

   c The lines can be in any arrangement. Learner's own diagram.

   d Learner's own check.

11 a

   b
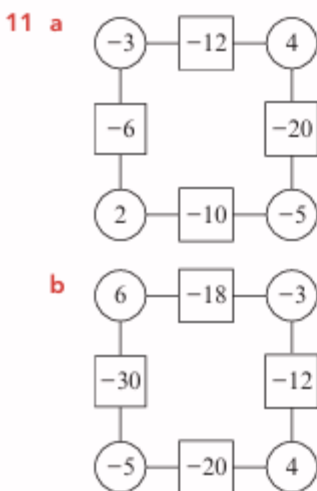
12 There are four possible answers. Going clockwise from the top left-hand circle, the possible answers are: 1, −10, 3, −8; −1, 10, −3, 8; 2, −5, 6, −4; −2, 5, −6, 4.

Exercise 1.3

1 a 5, 10, 15, 20, 25

   b 10, 20, 30, 40, 50

   c 7, 14, 21, 28, 35

   d 12, 24, 36, 48, 60

2 a 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39

   b 5, 10, 15, 20, 25, 30, 35

   c 15, 30

3 a 12, 24, 36, 48 b 12

4 24

5 30

6 56

7 a 4 × 7 = 28 is a multiple of 4 and 7.

   b 6 × 5 = 30 is a multiple of 6 and 5.

   c It is always true. A × B is a multiple of A (B times) and of B (A times).

   d It is sometimes true but not always true. It is true when A = 4 and B = 7, then A × B is 28 and this is the LCM.

   A counterexample is when A = 6 and B = 4, then A × B = 24 but the LCM is 12.

8 12

9 36

10 There are two possible answers: 1 and 21; 3 and 7.

11 There are four possible answers: 1 and 30; 2 and 15; 3 and 10; 5 and 6.

Reflection: Learner's own answer.

Exercise 1.4

1 a 1, 2, 3, 4, 6, 8, 12, 24

   b 1, 2, 5, 10, 25, 50

   c 1, 3, 5, 9, 15, 45

   d 1, 19

2 a 1, 3, 11, 33 b 1, 2, 17, 34

   c 1, 5, 7, 35 d 1, 2, 3, 4, 6, 9, 12, 18, 36

   e 1, 37

3 a 1, 2, 3, 6 b 6

4 a 4 b 6 c 12

5 a 6 b 1 c 2 d 7

6 a 10 b 20 c 30

7 a 7 b $\frac{5}{8}$

Reflection: For example: If you divide the numerator and the denominator by the highest common factor, you have the fraction in its simplest form.

8 a 1

b You simplify $\frac{25}{36}$ by dividing 25 and 36 by a common factor. Since 1 is the only common factor, the fraction cannot be simplified.

9 9

10 a There are four possible pairs: 12 and 28, 12 and 32, 16 and 28, 16 and 36.

b Learner's own answer.

11 a 4 **b** 24 **c** $8 \times 12 = 96$

d $HCF \times LCM = 96$

e The answers are equal. This is always true.

f Learner's own answer.

12 a 3 is a factor of both numbers, so each number is a multiple of 3.

b 45 is a multiple of both numbers, so each number is a factor of 45.

c 9 and 15

d Learner's own answer.

Exercise 1.5

1 a $2 + 8 + 5 + 7 + 2 = 24$; this is a multiple of 3 but is not a multiple of 9.

b 28 575 has a total of 27, so is divisible by 9.

2 a $5 + 7 + 4 + 2 + 3 = 21$, which is a multiple of 3. 21 is odd, so 6 is not a factor.

b 0 or 6

3 a The final digit is even, so it is divisible by 2; the last two digits are 64 and this is divisible by 4, so the number is divisible by 4.

b The last three digits are 764 and $764 \div 8 = 95$ r. 4, so it is not a multiple of 8.

4 a $2 + 5 + 3 + 2 + 0 = 12$, which is a multiple of 3; 20 is a multiple of 4.

b Possible answers are 2, 5, 6, 8 and 10.

5 a–c Learner's own answers.

6 a odd $9 + 4 = 13$; even $= 2$; $13 - 2 = 11$

b odd $= 4 + 0 + 6 = 10$; even $= 8 + 1 + 1 = 10$; $10 - 10 = 0$, so it is a multiple of 11.

7 a $258 - 2 \times 3 = 252$ and $252 \div 7 = 36$

b $385 - 2 \times 2 = 381$ and $381 \div 7 = 54$ r 3

8 a The number is odd, so 2, 4, 6 and 8 are not factors. The last digit is 9, so 5 is not a factor. The sum of the digits is 27, so both 3 and 9 are factors. $22\,599 \div 7 = 3228$ r. 3, so 7 is not a factor. So, 3 and 9 are the only factors between 1 and 10.

b 99 522 has the same digits as 22 599 (the number in part **a**), so 3 and 9 are still factors. It is even, so 2 is a factor. 6 is also a factor, but 4 and 8 are not factors. 5 is not a factor. 7 is not a factor. The factors are 2, 3, 6 and 9.

9

Number	Factors between 1 and 10
12	2, 3, 4, 6
123	3
1234	2
12345	3, 5
123456	2, 3, 4, 6, 8

10 For example: 4675 because $4 + 7 = 6 + 5 = 11$. There are seven other possibilities.

11 a 2521 is odd and so not divisible by 2, 4, 6, 8 or 10. The sum of the digits is 10, so it is not divisible by 3 or 9. The last digit is 1, so it is not divisible by 5; $2521 \div 7 = 360$ r. 1. $1 + 5 = 6$ and $2 + 2 = 4$, so it is not divisible by 11.

b Any number with these digits that ends in 5.

c Any number with these digits that ends in 12 or 52.

d 2512 or 2152

e 2526

f 2530

12 a Because the last digit is 4, it is even and is divisible by 4.

b The last digit is always 4 and never 0 or 5.

c i 444 is possible.

ii 444 444 or 444 444 444 and so on because the sum of the digits is 24 and so on. Always a multiple of 3.

d **i** 44 is possible.

  ii 4444 or 444 444 or . . . If there is an even number of digits, the difference calculated in the test is 0.

13 a It is false. 12 is divisible by 2 and 4, but it is not divisible by 8.

  b It is true. A number divisible by 10 has a last digit of 0. Hence, it is even and also divisible by 5.

  c It is true. Learner's own answer.

Exercise 1.6

1 a 9 **b** 25 **c** 64

  d 100 **e** 225

2 a $\sqrt{9} = 3$ **b** $\sqrt{25} = 5$

  c $\sqrt{64} = 8$ **d** $\sqrt{100} = 10$

  e $\sqrt{225} = 15$

3 a 6 **b** 9 **c** 11 **d** 12

4 a 1 **b** 8 **c** 27 **d** 64

  e 125

5 a $\sqrt[3]{1} = 1$ **b** $\sqrt[3]{8} = 2$

  c $\sqrt[3]{27} = 3$ **d** $\sqrt[3]{64} = 4$

  e $\sqrt[3]{125} = 5$

6 a 4 **b** 8 **c** 12

7 a $9^2 = 81$ and $10^2 = 100$

  b 13 and 14 **c** 4 and 5

8 a 289 **b** $\sqrt{289} = 17$

9 a $\sqrt{324} = 18$ **b** $\sqrt{400} = 20$

  c $\sqrt{529} = 23$ **d** $\sqrt{676} = 26$

10 a $\sqrt[3]{343} = 7$ **b** $\sqrt[3]{729} = 9$

  c $\sqrt[3]{1000} = 10$ **d** $\sqrt[3]{1728} = 12$

11 a The factors are 1, 36, 2, 18, 3, 12, 4, 9, 6.

  b **i** 1, 9, 3 **ii** 1, 16, 2, 8, 4

  iii 1, 25, 5

  c Usually factors come in pairs. For example, $2 \times 18 = 36$ gives two factors, 2 and 18. Only for a square number can you get a single factor from a product. $6 \times 6 = 36$, so the total number is odd.

d Impossible

e No; a counterexample is 8, which is 2^3 and has four factors, 1, 2, 4 and 8.

f Learner's own answer.

Reflection: Learner's own answer.

12 a The differences are 3, 5, 7, 9, 11, . . .

  b They are odd numbers. They increase by two each time. Add the two numbers that are squared to find the difference.

  c The differences are 7, 19, 37, 61, 91, . . .

13 a **i** 1 **ii** 3 **iii** 6

  b The answer is the sum of the numbers cubed.

  c Try adding 4^3 and so on.

  d Learner's own answer.

14 a $\sqrt{1+3+5} = 3$

  b $\sqrt{1+3+5+7} = 4$

  c $\sqrt{1+3+5+7+9} = 5$ and so on.

  d The numbers in each part are $1+3+5+7 = 16$, which equals a 4 by 4 square. Compare with part **b**.

Check your progress

1 a −4 **b** −10 **c** −12 **d** −5

2 a 5 and −3 **b** 10 and −7

3 a −3 **b** 6

4 1, 2, 4, 8

5 a 54, 60, 66 **b** 30

6 a 13 **b** $\frac{2}{5}$

7 a $\sqrt{N}$ is an integer, so $\sqrt{N} \times \sqrt{N} = N$ is a square number.

  b $N = 64$

8 a 32 is divisible by 4.

  b 1 or 4 or 7

  c 9

9 $9^3 = 27^2$ and $16^3 = 64^2$

Unit 3 Getting started

1 a 20 b 400 c 7000
   d 130 e 3500 f 81 000

2 a C b A c B
   d C e A f C

3 a T
   b F (correct answer: 0.12)
   c T
   d F (correct answer: 3.46)
   e T
   f F (correct answer: 4.25)

4 150, 15, 15 000, 150, 0.15, 1.5, 150

5 a 7 b 4 c 18
   d 145 e 12 f 89
   g 254 h 124

6 a B b A c B
   d B e A

Exercise 3.1

1 a i 1000 ii one thousand
   b i 100 000
      ii one hundred thousand
   c i 10 000 000 ii ten million
   d i 10 ii ten

2 a 10^2 b 10^8 c 10^4 d 10^{10}

3 a 30 000 b 5 000 000
   c 4 500 000 d 291 000

4 Yes

5 a 2300 b 7 680 000 c 9 000 000

6 a 420 b 65 000
   c 12 700 d 2 870 000

7 a–c Learner's own answers.
   d Marcus' method doesn't work because the number being multiplied has decimal places.

8 a 47 000
   b 91 500
   c 3 300 000

9 a 1500 b 10^2 c 6.12 d 6

10 a 8 b 805

11 Yes, as long as there are enough zeros to cross off.

12 a 8 b 510 c 84 600

13 Learner's own answers.

14 a 23 b 2.3 c 0.23
    d 0.023 e 6.5 f 0.65
    g 0.065 h 0.0065 i 0.9
    j 0.09 k 0.009 l 0.0009

15 a B b A c C

16 a 80 b 150
    c 7000 d 3400
    e 9 000 000 f 600 000
    g 124 h 32 250 000

17 a 8 km

b number of km = number of mm ÷ 10^6

c i 90   **ii** 15.6   **iii** 0.77

18 a Group 1: $78\,000 \div 10^3$, $780 \div 10$, 0.0078×10^4; group 2: 7.8×10^3, $78\,000\,000 \div 10^4$, 780×10; group 3: 0.00078×10^6, $7\,800\,000\,000 \div 10^7$, 78×10. The left-over card is $780 \div 10^2$.

b For example: 0.078×10^2, 0.78×10, $78 \div 10$, $7800 \div 10^3$

Reflection: Learner's own answers.

Exercise 3.2

1 b 8.42   **c** 39.56   **d** 0.49

e 138.22   **f** 0.07

2 a Sofia

b Arun rounded to one decimal place, as he has only written one digit after the decimal place.

3 Any distance from 9.545 km to 9.554999999. . . km.

4 a 12.894   **b** 127.997

c 0.201   **d** 9.350

5 a Learner's own answers.

b Easy to follow method that shows workings. More difficult to make a mistake because the rounding is done in easy steps.

c Learner's own answers.

d Draw a line after the digit in the sixth decimal place, circle the digit in the seventh decimal place, then decide whether to increase the digit before the line by 1 (if the circled number is 5, 6, 7, 8 or 9) or leave it unchanged (if the circled number is 0, 1, 2, 3 or 4).

6 a B   **b** C   **c** A

7 a 126.9923   **b** 0.8

c 782.030   **d** 3.1415927

e 4.00   **f** 100.0

8 a A and c and iv; B and a and iii; C and e and i; D and b and vi; E and f and ii; F and d and v

b Advantage: you will get all the answers; disadvantage: this method takes a long time.

c You could start by matching the rounded numbers to the degree of accuracy. This is easy, just by counting the number of decimal places. You could then find which original number rounds to 6 d.p., then 5 d.p., then 4 d.p., etc.

9 a 1.29   **b** 4.5333   **c** 1.310

Activity 3.1

Learner's own answers.

10 a Sofia = $15, Marcus = $15.50, Arun = $15.49

b Marcus, as his is the only amount that covers the bill.

Sofia's way is $3 \times 15 = \$45$ (not enough); Marcus' way is $3 \times 15.50 = \$46.50$ (enough); Arun's way is $3 \times 15.49 = \$46.47$ (not enough).

c Learner's own answers. For example: You could round up to $16 each, which would leave a small tip.

Check your progress

1 a 10 000   **b** ten thousand

2 a 10^3 **b** 10^6

3 a 40 000   **b** 12 000 000

c 890 000   **d** 4660

4 a 7   **b** 340

c 1.4   **d** 0.312

5 a 78.93   **b** 0.6674

c 154.829   **d** 6.505050

Unit 4 Getting started

1 b <   **c** >   **d** >

e >   **f** <

2 15.0, 15.3, 15.6, 15.9

3 a F   **b** T   **c** T

d F   **e** F   **f** T

4　**a**　12.91　　**b**　14.18

　　c　1.85　　**d**　3.97

5　$5 \times 5.42 = 27.1$, $8 \times 3.3 = 26.4$, $4 \times 6.9 = 27.6$, $12 \times 2.4 = 28.8$, $6 \times 4.25 = 25.5$

6　**a**　2.1　　**b**　0.7

　　c　3.11　　**d**　2.75

Exercise 4.1

1　**a**　9.99　　**b**　3.67　　**c**　12.56

　　d　127.06　**e**　0.67　　**f**　3.21

　　g　18.45　　**h**　0.043　**i**　0.09

2　**a**　10.49, 10.64, 10.65, 10.73, 10.74, 10.75

　　b　Shelly-Ann Fraser

3　No; looking at the tenths, 2 is less than 4.

4　**a**　<　**b**　<　　**c**　<　　**d**　>

　　e　>　**f**　<　　**g**　>　　**h**　>

5　**a**　=　**b**　≠　　**c**　≠

　　d　=　**e**　=　　**f**　≠

6　**a**　2.009, 2.15, 2.7

　　b　3.2, 3.342, 3.45

　　c　17.05, 17.1, 17.125, 17.42

　　d　0.52, 0.59, 0.71, 0.77

　　e　5.199, 5.2, 5.212, 5.219

　　f　9.03, 9.08, 9.7, 9.901, 9.99

　　g　Advantage: easy method; disadvantage: could take a long time

Reflection:　Learner's own answer.

7　**a**　300 mL, 38.1 cL, 0.385 L

　　b　7.3 cm, 0.705 m, 725 mm

　　c　519 000 mg, 530 g, 5.12 kg, 0.0058 t

　　d　0.45 m, 4450 mm, 0.0046 km, 461.5 cm

8　**a**　Any three numbers between 3.071 and 3.082.

　　b　12

c　All of the three decimal numbers are between 3.07 and 3.083 (but not including 3.070 and 3.083); i.e. 3.071, 3.072, 3.073, 3.074, 3.075, 3.076, 3.077, 3.078, 3.079, 3.080, 3.081, 3.082.

Exercise 4.2

1　**a**　7.7　　**b**　17.2

　　c　3.4　　**d**　8.0

2　Learner's own answer.

3　$1 - 0.36 = 0.64$, $1 - 0.78 = 0.22$, $1 - 0.44 = 0.56$, $1 - 0.284 = 0.716$, $1 - 0.432 = 0.568$

4　**a**　4.8　**b**　5.4　　**c**　2.7　　**d**　9.4

5　No, she must subtract the extra 0.2 to give 12.3.

6　**a**　12.2　　**b**　18.5　　**c**　26.1

　　d　3.5　　**e**　10.5　　**f**　14.4

7　**a**　34.21　　**b**　4.66　　**c**　29.13

8　**a**　July　　**b**　86.53 kg

9　**a**　17.28　　**b**　33.342

10　**a**　Marcus' method: Advantage is that it works with numbers of all sizes; disadvantage is that it is still time-consuming even for simple numbers.

　　　Arun's method: Advantage is that it is a quick method to use for numbers that have a small number of decimal places; disadvantage: can be confusing to use for numbers that have lots of decimal places.

　　b　Learner's own answer.

　　c　Learner's own answer.

11　**a**　3.58　　**b**　7.17

　　c　25.45　　**d**　23.218

12　**a**　$7.35　　**b**　$2.65

13　**a**　8.6 m　　**b**　1.4 m

14　**a**　−4.14　　**b**　−7.28

　　c　−5.88　　**d**　−2.979

15　**a**　−15　　**b**　−23.52

　　c　4.14　　**d**　7.28

Exercise 4.3

1 a 0.8 **b** 2.5 **c** 1.8

2 a 0.12 **b** 1.2 **c** 0.012 **d** 12

3
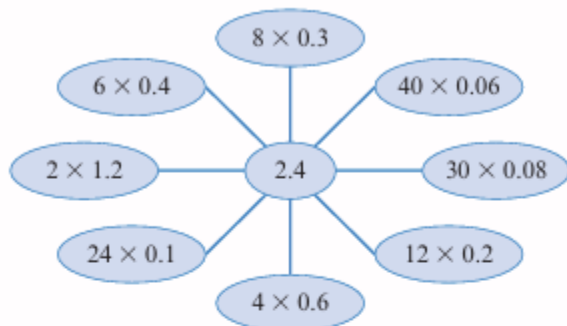
4 a 2761.3 **b** 276.13

5 a $52.1 \times 53 = 2761.3$, the answers are the same.

b 521 is 100×5.21 and 0.53 is $53 \div 100$, so the $\times 100$ and $\div 100$ cancel each other out.

6 a 5508

b i 550.8 **ii** 55.08 **iii** 5.508

iv 550.8 **v** 55.08 **vi** 5.508

Activity 4.1

Learner's own answers.

7 a Advantages: simple step-by-step method, easy to see any mistakes; disadvantages: a slow method.

b Learner's own answer.

Reflection: Learner's own answer.

8 a 166.4; check: $3 \times 50 = 150$

b 3110.4; check: $8 \times 400 = 3200$

c 31.98; check: $0.8 \times 40 = 32$

9 a An approximate answer of $50 \times 20 = 1000$. 85.23 is too far from 1000 for it to be correct.

b 852.3

10 8.28 g

11 He will get $354.75, which is just over $350, so yes he is correct.

12 $91 + $97.75 + $88 + $108 = $384.75

Exercise 4.4

1 a 2.138 **b** 1.877 **c** 0.816

d 1.308 **e** 1.092 **f** 0.094

2 a 4.327 **b** 1.487

c 6.585 **d** 7.364

3 $1.16

4 $3.65

5 $24.25

6 a 2.321 **b** 3.125 **c** 31.313

7 a Lara forgot to write the '0' above the 4.

b 7.025

8 a Kyle forgot to add a '0' to the end of 251.55 to put the remainder next to.

b 9.675

9 a Rounding or approximating; for example: $60 \div 10$, $56 \div 9$, $54 \div 9$

b For example: Work out 9×6.258 and it should equal 56.322.

10 a 14, 28, 42, 56, 70, 84, 98, 112, 126

b 9.028

c $126 \div 14 = 9$; $9.028 \times 14 = 126.392$

11 a i 235 **ii** 23.5

iii 2.35 **iv** 0.235

b Learner's own answer.

c i 4.7 **ii** 0.47 **iii** 0.047

d Learner's own answer.

12 a 1.5 **b** 1.35 **c** 0.662

13 a
$$\begin{array}{r} 3\,.\,9\ 8\ 2 \\ 2\,\overline{\smash{)}\,7\,.^{1}9\ 6\ 4} \end{array}$$

b
$$\begin{array}{r} 1\,.\,5\ 0\ 7 \\ 6\,\overline{\smash{)}\,9\,.0\ 4\ 2} \end{array}$$

c
$$\begin{array}{r} 1\,.\,6\ 9\ 9 \\ 5\,\overline{\smash{)}\,8\,.^{3}4\ 9\ 5} \end{array}$$

Reflection: Learner's own answer.

Exercise 4.5

1 **a** $= 7 \times 18$

$= 7 \times 10 + 7 \times 8$

$= 70 + 56$

$= 126$

   b $= 4 \times 76$

$= 4 \times 70 + 4 \times 6$

$= 280 + 24$

$= 304$

2 **a** 246   **b** 288   **c** 64   **d** 424

3 For example, when you multiply two numbers together:

- If you multiply one of the numbers by 10 and divide the other number by 10, it keeps the value of the calculation the same.

- If you multiply one of the numbers by 100 and divide the other number by 100, it keeps the value of the calculation the same.

4 **a** 2070, 1035, 345

   b $2070 + 1035 + 345 = 3450$

5 **a** $46 - 4.6 = 41.4$

   b $73 - 7.3 = 65.7$

6 **a** 61.2   **b** 42.3   **c** 113.4

7 Learner's own answers.

8 **a** 25.2   **b** 39   **c** 50.4

9 34.4 cm

10 **a** $= \dfrac{1.455}{3}$ **b** $= \dfrac{67.35 + 10}{50 + 10}$

$= 0.485$ $= \dfrac{6.735}{5}$

$= 1.347$

   c $= \dfrac{0.4585}{7}$ **d** $= \dfrac{893.6 + 100}{200 + 100}$

$= 0.0655$ $= \dfrac{8.936}{2}$

$= 4.468$

11 When you divide both the numerator and the denominator by 10, it is equivalent to dividing the fraction by 1 and so it keeps the answer the same, but makes the calculation easier to do.

$\dfrac{45.6 + 10}{30 + 10} = \dfrac{4.56}{3}$

12 **a** **i** $28.21 **ii** $28

   b $28.21 is better, as it gets closer to the actual bill (but $20 \times \$28.21 = \$564.20$, so will be 5 cents below the actual bill).

Check your progress

1 6.09, 6.45, 6.481, 6.5, 6.549

2 **a** 18.3   **b** 2.5

3 **a** 5.229   **b** 35.65

4 **a** 0.326   **b** 4.22

5 **a** 0.08   **b** 0.021

6 **a** 1339.8   **b** 133.98

7 254.93

8 7.356

9 **a** 13, 26, 39, 52, 65, 78, 91, 104, 117

   b 18.365

   c $18.365 \times 13 = 238.745$

10 **a** 63   **b** 77.4   **c** 1.16

Unit 7 Getting started

1 a
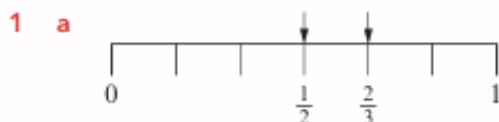
b $\frac{2}{3}$

2 b <   **c** >   **d** <

e <   **f** <

3 a $1\frac{2}{3}$ **b** $1\frac{2}{5}$ **c** $1\frac{2}{9}$ **d** $3\frac{3}{4}$

4 a $1\frac{1}{10}$ **b** $1\frac{7}{12}$

5 a 6   **b** 10   **c** 18

Exercise 7.1

1 a ≠   **b** =   **c** ≠

d ≠   **e** =   **f** ≠

2 b <   **c** <   **d** >

f <   **g** >   **h** >

3 a Marcus. Advantage: have to compare only simple fractions; disadvantage: have to first convert both fractions to mixed numbers.

Arun. Advantage: have to convert the fractions to give only a common denominator; disadvantage: might end up with large numbers to calculate.

b Learner's own answers.

Reflection: Learner's own answers.

4 a $\frac{47}{6}$ **b** $\frac{42}{5}$ **c** $\frac{33}{10}$

5 Learner's own answer. Order of cards:
$\frac{1}{4}, \frac{7}{12}, \frac{13}{10}, \frac{7}{5}$

6 As many decimal places as are needed to put the decimals in order of size.

7 a i $0.8\dot{3}$

ii $0.\dot{7}\dot{2}, 1.\dot{7}\dot{2}.$

iii $0.\dot{8}, 1.\dot{8}$

b $\frac{19}{11}, \frac{11}{6}, \frac{17}{9}$

8 a $\frac{7}{3} = 2.33\ldots, \frac{16}{7} = 2.28\ldots, \frac{58}{25} = 2.32, \frac{9}{4} = 2.25$

b $\frac{9}{4}, \frac{16}{7}, \frac{58}{25}, \frac{7}{3}$

9 $\frac{37}{10}, 3\frac{5}{7}, \frac{15}{4}, 3\frac{4}{5}$

10 First mark: any two of $\frac{5}{3}, \frac{13}{8}, \frac{17}{10}, \frac{27}{16}, \frac{33}{20}, \frac{67}{40}, \frac{69}{40},$
$\frac{129}{80}, \frac{131}{80}, \frac{133}{80}, \frac{137}{80}, \ldots$

Second mark: any two of $\frac{9}{5}, \frac{11}{6}, \frac{15}{8}, \frac{16}{9}, \frac{43}{24}, \frac{65}{36},$
$\frac{67}{36}, \frac{127}{72}, \frac{131}{72}, \frac{133}{72}, \ldots$

Exercise 7.2

1 a $3\frac{8}{9}$ **b** $10\frac{1}{2}$ **c** $8\frac{2}{7}$
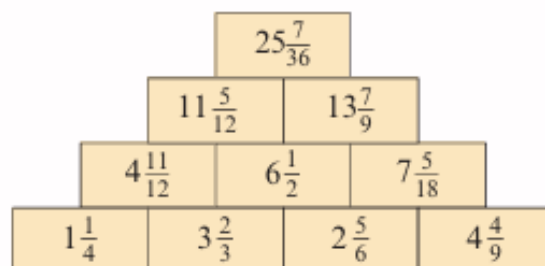
2 $16\frac{2}{3}$m

3 a $3\frac{3}{4}$ **b** $7\frac{1}{2}$ **c** $5\frac{1}{6}$

4 a $4\frac{3}{8}$m   **b** Yes, $4\frac{3}{8} < 4\frac{1}{2}$

5 $18\frac{5}{12}$km

6 a $\frac{29}{24} = 1\frac{5}{24},$ not $1\frac{4}{24}$ **b** $13\frac{5}{24}$

7

8 a $5\frac{1}{2}x$ **b** $9\frac{1}{10}y+2\frac{2}{3}x$

c $8\frac{13}{24}a+9\frac{1}{14}b$ **d** $1\frac{13}{15}p+10\frac{7}{40}q$

9 a $5\frac{2}{3}$ is between 5 and 6, $7\frac{7}{8}$ is between 7 and 8. So $5\frac{2}{3}+7\frac{7}{8}$ is between $5+7$ (12) and $6+8$ (14). Zara is correct.

b–d Learner's own answers.

10 $13\frac{11}{36}$ m

Exercise 7.3

1 a $\frac{1}{8}$ **b** $\frac{3}{16}$ **c** $\frac{2}{15}$

d $\frac{8}{25}$ **e** $\frac{9}{28}$ **f** $\frac{14}{27}$

2 a $\frac{3}{10}$ **b** $\frac{1}{2}$ **c** $\frac{3}{10}$

d $\frac{2}{9}$ **e** $\frac{1}{4}$ **f** $\frac{2}{11}$

3 $\frac{1}{3}$ cup cashew nuts, $\frac{1}{6}$ cup of water, $\frac{1}{8}$ cup of vinegar, 1 tablespoon of honey, $\frac{1}{4}$ teaspoon of salt

4 $\frac{2}{45}$ m²

5 $\frac{9}{16}$ m²

6 For example: $\frac{3\times3}{4\times4}$ or $\frac{3^2}{4^2}$ or 0.75×0.75, etc.

7 a $\frac{4}{9}$ **b** $\frac{4}{7}$ **c** $\frac{5}{21}$ **d** $\frac{20}{63}$

8 a $\frac{9}{20}$ **b** $\frac{3}{20}$

9 $\frac{1}{6}$

10 Yes; a proper fraction is always less than 1. Multiplying two numbers that are both smaller than 1 will always give a number smaller than 1.

11 a Estimate $\frac{2}{3}$ is greater than $\frac{1}{2}$, but is less than 1.

$\frac{1}{2}$ of $\frac{1}{8}$ is $\frac{1}{16}$ and $1\times\frac{1}{8}=\frac{1}{8}$.

So, the answer to $\frac{2}{3}\times\frac{1}{8}$ must be greater than $\frac{1}{16}$ but is smaller than $\frac{1}{8}$.

Accurate $\frac{2}{3}\times\frac{1}{8}=\frac{2\times1}{3\times8}=\frac{2}{24}=\frac{1}{12}$

$\frac{1}{12}$ is greater than $\frac{1}{16}$ but is smaller than $\frac{1}{8}$.✓

b Estimate $\frac{2}{9}$ is greater than zero, but is less than $\frac{1}{2}$.

$0\times\frac{1}{4}=0$ and $\frac{1}{2}$ of $\frac{1}{4}$ is $\frac{1}{8}$.

So, the answer to $\frac{2}{9}\times\frac{1}{4}$ must be greater than zero but is smaller than $\frac{1}{8}$.

Accurate $\frac{2}{9}\times\frac{1}{4}=\frac{2\times1}{9\times4}=\frac{2}{36}=\frac{1}{18}$

$\frac{1}{18}$ is greater than zero but is smaller than $\frac{1}{8}$.✓

c Estimate $\frac{5}{8}$ is greater than $\frac{1}{2}$, but is less than 1.

$\frac{1}{2}$ of $\frac{4}{9}$ is $\frac{2}{9}$ and $1\times\frac{4}{9}=\frac{4}{9}$.

So, the answer to $\frac{5}{8}\times\frac{4}{9}$ must be greater than $\frac{2}{9}$ but is smaller than $\frac{4}{9}$.

Accurate $\frac{5}{8}\times\frac{4}{9}=\frac{5\times4}{8\times9}=\frac{20}{72}=\frac{5}{18}$

$\frac{5}{18}$ is greater than $\frac{2}{9}=\frac{4}{18}$ but is smaller than $\frac{4}{9}=\frac{8}{18}$.✓

12 Mental maths is fun

13 $\frac{73}{80}$ m²

Reflection: Learner's own answers.

Exercise 7.4

1 a $\frac{4}{15}$ b $\frac{7}{9}$

2 a $\frac{3}{8}$ b $\frac{5}{6}$ c $\frac{21}{32}$

   d $7\frac{1}{5}$ e $3\frac{3}{10}$ f $2\frac{7}{10}$

3 a $1\frac{1}{2}$ b $2\frac{2}{3}$ c $1\frac{1}{4}$

   d $1\frac{1}{3}$ e 2 f $1\frac{1}{6}$

4 a Isaac did not turn the second fraction upside down.

      Isaac turned the first fraction upside down rather than the second.

   b $1\frac{1}{9}$

5 $\frac{4}{9}$ m

6 $\frac{5}{6}$

7 a–c Learner's own answers.

Activity 7.1

   Learner's own answers.

8 No; any number divided by a larger number gives an answer smaller than 1. Any number divided by a smaller number gives an answer greater than 1.

9 $\frac{1}{2}\times\frac{1}{3}+\frac{1}{4}\times\frac{1}{5}+\frac{1}{6}\times\frac{1}{7}+\frac{1}{8}\times\frac{1}{9}+\frac{1}{10}=1\frac{1}{63}$

Exercise 7.5

1 a 14 b 130 c 15 d 50

2 Learner's own answer.

3 a 27 b 25 c 35 d 12

4 a 68 b 64

5 a 54 b 64 c 126 d 128

6 a 55 b 285

   c 315 d 3850

7 a $\frac{5}{9}$ b $\frac{6}{17}$

8 a $\frac{5}{16}$ b $\frac{13}{35}$ c $\frac{14}{25}$ d $\frac{8}{19}$

9 No; $8\times3=24$, not 8×4. The answer is $\frac{5}{33}$.

10 a Arun works out $\frac{1}{6}$ and multiplies that answer by the numerator (5) to give $\frac{5}{6}$ of 180.

    b Sofia works out $\frac{1}{6}$ and takes it away from the whole to leave $\frac{5}{6}$ of 180.

    c i 240 ii 840

    d Learner's own answer.

    e Arun. Advantage: by dividing first, you use small numbers; disadvantage: doing this mentally could be difficult, especially the multiplication.

      Sofia. Advantage: subtraction might be easier than multiplication; disadvantage: not so easy for more complicated fractions, such as when the numerator is 2 or is smaller than the denominator.

    f Learner's own answer.

    g i 1710 ii 768 iii 2080

11 a Zara

    b Sofia did not use order of operations rules and did the addition before the multiplication.

12 a $1\frac{1}{8}$ b $\frac{11}{15}$ c $\frac{11}{32}$

Check your progress

1 a $\neq$ b $=$ c $\neq$

2 a $>$ b $<$ c $>$

3 a $7\frac{3}{4}$ b $8\frac{7}{20}$

4 a $\frac{7}{15}$ b $1\frac{1}{9}$

5 a 125 b 168 c 5800

› Workbook answers

Exercise 1.1

1 a −7   b 1   c −5   d 5

2 a −2   b −9   c 9   d 1

3

+	4	−5
2	6	−3
−6	−2	−11

4 a 15   b −25   c −15   d 17

5 a 25   b 5   c 11   d −23

6 a −7   b 6   c 4   d −10

7 a 9   b 5   c 2   d −3

8 a 4   b 17   c −20   d 6

9 a −80   b 200   c −800 d −90

10 −6

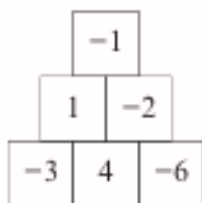11 Two possible answers: −2 or 4.

12 a −3 + 4 = 1   b −5 + 3 = −2

c 5 + −2 = 3

13

+	3	−4
2	5	−2
−2	1	−6

14

−	−4	6	2
3	7	−3	1
−3	1	−9	−5

15 a

b
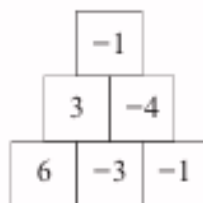
16
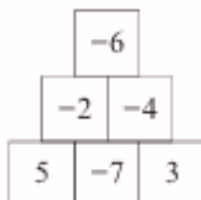
One method is to try different numbers in the bottom square. Try to get closer to −6 each time.

Exercise 1.2

1 a −30   b −36   c −55   d −49

2 a −12   b −4   c −5   d −7

3

×	4	7
−2	−8	−14
−6	−24	−42

4 a −12   b −30   c −28   d −30

5 a −3   b −7   c −2   d −6

6 a −8   b −3   c 13   d 5

7 a 9   b −4   c −36   d 32

8 a −12   b 21   c 8   d −3

9 a −1200 b −900 c −1200 d −200

10 a −2 and 9; 3 and −6; −3 and 6; 1 and −18; −1 and 18

b There are two more, as listed in part a.

11

×	6	4
−5	−30	−20
−8	−48	−32

12 a i

ii −55

b i

ii −75

13 a

b There are two solutions.

14 a $(3 + -5) \times 4$ or $(-5 + 3) \times 4$

   b $(-4 + 7) \times 2 = 6$. The other possibilities are negative numbers.

15 a -1 and 20 have a sum of 19.

   b -1 and 30 have a sum of 29.

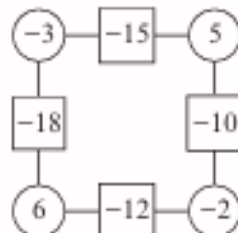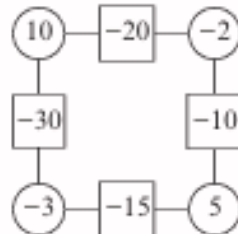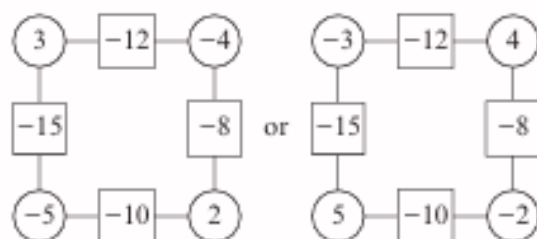   **c** For any negative integer, the largest possible sum is the corresponding positive integer -1. For example: For -15, the largest sum is $15 - 1 = 14$.

Exercise 1.3

1 a 4, 8, 12, 16   **b** 7, 14, 21, 28

   c 12, 24, 36, 48   **d** 30, 60, 90, 120

2 9

3 a 8, 16, 24, 32, 40, 48

   b 5, 10, 15, 20, 25, 30, 35, 40, 45

   c 40

4 a 6, 12, 18, 24, 30   **b** 6   **c** 6

5 a 12, 24, 36   **b** 12   **c** 12

6 a 30   **b** 20   **c** 10

7 The multiples of 3 are 3, 6, 9, 12, 15, . . .
The multiples of 5 are 5, 10, 15, . . . So 15 is the lowest common multiple and the multiples of 15 are common multiples.

8 42

9 a i 14   **ii** 28   **iii** 42

   b Multiply the two numbers.

   c It works unless the other number is a multiple of 7. For example: it works for 7 and 8, or 7 and 9, or 7 and 10, but not for 7 and 14, or 7 and 21.

10 a i 90   **ii** Yes

b i 98   **ii** No; the LCM is 14.

c i 96   **ii** No; the LCM is 24.

11 30

12 72

13 a Because $96 \div 4 = 24$ and $96 \div 24 = 4$.

   b No; the LCM is 24 because $24 = 6 \times 4$.

14 5 and 9

15 1 and 63; 7 and 9

Exercise 1.4

1 a 1, 3, 7, 21   **b** 1, 2, 4, 8, 16, 32

   c 1, 2, 5, 10, 25, 50

   d 1, 2, 3, 4, 6, 8, 9, 12, 18, 24, 36, 72

   e 1, 43

2 a 1, 3, 17, 51   **b** 1, 2, 4, 13, 26, 52

   c 1, 53   **d** 1, 2, 3, 6, 9, 18, 27, 54

   e 1, 5, 11, 55

3 a 1, 2, 4   **b** 4

4 a 1, 3, 5, 15   **b** 15

5 a 3   **b** 9   **c** 18

6 a 9   **b** 25   **c** 8   **d** 1

7 a 7   **b** 5   **c** 14

8 a 8   **b** $\frac{4}{5}$

9 a 13   **b** $\frac{4}{7}$

10 5 and 30; 10 and 25; 15 and 20

11 a $8 = 4 \times 2$ and $12 = 4 \times 3$

   b 8 is the HCF because $16 = 2 \times 8$.

   c 8 and 20; 8 and 28; 12 and 16; 12 and 20; 12 and 28; 16 and 20; 16 and 28; 24 and 28

12 3 or 6 or 12 or 15 or 21 or 24 . . . Any multiple of 3 that is not a multiple of 9.

13 a i 1   **ii** 1   **iii** 1

   b The HCF of two consecutive numbers is 1.

   c The LCM of two consecutive numbers is the product of the numbers. For example: the LCM of 4 and 5 is 20.

Exercise 1.5

1   $28 \div 4 = 7$; 28 is divisible by 4 and so is 5328;
    $5 + 3 + 2 + 8 = 18$, which is divisible by 9.

2   **a**   odd $= 9 + 7 = 16$; even $= 3 + 2 = 5$;
        $16 - 5 = 11$

    b   Yes, the sums are the same. This time
        odd $= 5$ and even $= 16$; $5 - 16 = -11$.

3   **a**   The last two digits make the number 8,
        which is divisible by 4.

    b   No, the last three digits are not divisible
        by 8 because $108 \div 8 = 13$ r. 4.

4   The sum of the digits is $14 + *$. This is a
    multiple if 3 when it is 15, 18 or 21; $* = 1$
    or 4 or 7.

5   1, 7 and 11

6   **a   i**   Any number with these digits that
        ends in 5.

    ii   Any number with these digits because
        the sum of the digits is always 12.

    b   i   No, because the sum of the digits is 12.

    ii   Yes. For example: 1254 is a possible
        answer. The odd and even digit sums
        must be $1 + 5$ and $2 + 4$.

7   For example: $322 + 7 + 7 = 336$

8   It is divisible by 1. $520 = 8 \times 65$, so it is divisible
    by 2, 4, 8. It is also divisible by
    3 and therefore also divisible by 6.
    $2 + 5 + 2 + 0 = 9$, so it is divisible by 3 and 9.
    The last digit is 0, so it is divisible by 5 and 10.
    $2520 \div 7 = 360$, so it is divisible by 7.
    Odd $= 0 + 5 = 5$ and even $= 2 + 2 = 4$, so it is
    not divisible by 11. This shows that 11 is the
    smallest integer that is not a factor.

9   The numbers with an even number of digits.
    For example: 99, 9999, 999 999, . . .

10 **a**   It ends in 5, so it is divisible by 5.
        $7 + 9 + 0 + 5 = 21$, so it is divisible by 3.
        Hence, it is divisible by 15.

    b   The final digit must be 0 or 5. If it is 0, the
        other digit is 2, 5 or 8. If the final digit is 5,
        then the other digit is 0, 3, 6 or 9. These are
        the possible numbers: 20 805, 20 820, 20 835,
        20 850, 20 865, 20 880, 20 895.

11 1 is a factor. Another factor is 3 because the
    digit sum is 21, which is a multiple of 3. A third
    factor is 11 because $9 + 7 = 16$, $2 + 3 = 5$ and
    $12 - 5 = 11$.

12 It is odd, so it is not divisible by 2, 4, 6, 8
    or 10.
    It ends in 9, so it is not divisible by 5.
    The sum of the digits is 32, so 3 and 9 are
    not factors. Odd digit sum $= 15$ and even digit
    sum $= 17$, so 11 is not a factor. The only other
    possibility is 7, so that must be a factor.

13 **a**   1234 or 3456 or 5678   **b**   3456 or 6789

    c   2345

    d   There are none because odd $-$ even always
        equals 2.

Exercise 1.6

1   **a**   25   **b**   85   **c**   181

2   **a**   8   **b**   10   **c**   15   **d**   13

3   **a**   9   **b**   152   **c**   56

4   **a**   4   **b**   0   **c** -1

5   **a**   6   **b**   8   **c**   10   **d**   12

6   **a** $\sqrt{400} = 20$ **b** $\sqrt{625} = 25$

    c $\sqrt{900} = 30$ **d** $\sqrt{1225} = 35$

7   **a** $\sqrt[3]{216} = 6$ **b** $\sqrt[3]{1000} = 10$

    c $\sqrt[3]{1331} = 11$ **d** $\sqrt[3]{3375} = 15$

8   **a**   6   **b**   15   **c**   4

9   **a** $\sqrt{90}$ is between 9 and 10

    b $\sqrt{135}$ is between 11 and 12

10 144

11 **a**   121, 144, 169 and 196

    b   125

12 7

13 **a**   64   **b** $\sqrt[3]{64} = 4$ and $\sqrt{4} = 2$

14 361

15 2197

16 **a** $\sqrt{64} = 8$ and $\sqrt[3]{64} = 4$

    b   729 because $\sqrt{729} = 27$ and $\sqrt[3]{729} = 9$.

    c   Learner's own answer.

6 a A **b** C **c** B **d** C

7 a 5600 **b** 8 770 000 **c** 13 000 000
d 65 000 **e** 33 200 **f** 650 000

8 a 37 000 **b** 10^3 **c** 8.9 **d** 10^7

9 a 9 **b** 52 **c** 80

10

	$\div 10^2$	$\div 10^3$	$\div 10^4$	$\div 10^5$	$\div 10^6$
400 000	4000	400	40	4	0.4
56 000	560	56	5.6	0.56	0.056
3000	30	3	0.3	0.03	0.003
720	7.2	0.72	0.072	0.0072	0.00072

11 a B **b** A **c** C

12 No; it would be quicker for Arun to just multiply his starting number by 100 not 10.

13 a 28 000 mg = 28 g
b 750 mg = 0.75 g
c 2 000 000 mg = 2 kg
d 83 000 mg = 0.083 kg
e 53 000 000 000 mg = 53 t
f 2 500 000 mg = 0.0025 t

14 a number of g = number of mg ÷ 10^3
number of kg = number of mg ÷ 10^6
number of t = number of mg ÷ 10^9

b i 45 g = 45 000 mg
ii 7.6 kg = 7 600 000 mg
iii 0.0657 t = 65 700 000 mg

15 a Space station, weather satellite, Moon, Venus, Jupiter, Neptune.

You can tell from the power on the 10. The smaller the power, the closer it is to Earth.

b

Object	Distance from Earth (km)
space station	408
weather satellite	36 000
Moon	384 400
Venus	41 400 000
Jupiter	628 700 000
Neptune	4 350 000 000

Exercise 3.1

1 A and iii because $1000 = 10^3$.
B and v because $100 = 10^2$.
C and i because $100 000 = 10^5$.
D and ii because $10 000 000 = 10^7$.
E and iv because $10 000 = 10^4$.

2 a $6 \times 10^4 = 6 \times 10 000 = 60 000$
b $9 \times 10^4 = 9 \times 10 000 = 90 000$
c $3 \times 10^4 = 3 \times 10 000 = 30 000$

3 a $2 \times 10^5 = 2 \times 100 000 = 200 000$
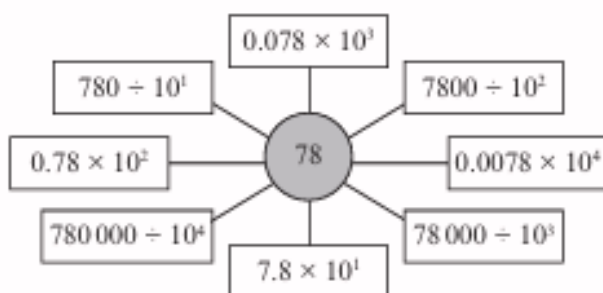**b** $7 \times 10^5 = 7 \times 100 000 = 700 000$
c $5 \times 10^5 = 5 \times 100 000 = 500 000$

4 a B **b** A **c** C

5 a 8 **b** 20 **c** 40
d 9 **e** 3 **f** 500

16 There are many different answers for this diagram. One example is given.

- 0.078×10^3
- $780 \div 10^1$
- $7800 \div 10^2$
- 0.78×10^2
- **78**
- 0.0078×10^4
- $780\,000 \div 10^4$
- $78\,000 \div 10^3$
- 7.8×10^1

17 a 41 000 **b** 9.24

  c 25 **d** 20.7

Exercise 3.2

1 a 4.5 **b** 3.7 **c** 8.8

  d 7.2 **e** 2.4 **f** 4.1

2 a B **b** B **c** A

  d A **e** B

3 a 2.47 **b** 8.66 **c** 3.31

  d 8.07 **e** 1.94 **f** 2.42

4 a B **b** A **c** A

  d B **e** B

5 a 4.98 **b** 9.04 **c** 24.33

  d 128.64 **e** 0.67 **f** 0.03

6 a 7.285 **b** 65.882

  c 134.903 **d** 0.679

  e 300.004 **f** 0.009

7 a 3.8826 **b** 61.8902

  c 143.5623 **d** 200.0068

  e 300.0006 **f** 18.2525

8 a B **b** A **c** A

9 0.00660 mm

10 a 1.73 **b** 11.1538

  c 35.434

11 a 480 **b** 477

  c 476.9 **d** 476.89

  e 476.893 **f** 476.8926

  g 476.89256 **h** 476.892564

  i 476.8925637 **j** 476.89256370

12 a $0.63636\ldots = 0.6364$ (4 d.p.)

  b $1.5714\ldots = 1.571$ (3 d.p.)

  c $1.444\ldots = 1.44$ (2 d.p.)

  d i Marcus $= 8.285$, Arun $= 8.286$

  ii no

  iii Arun's method. You need to find the number in the fourth decimal place so you know whether you need to round up or down the number in the third decimal place.

13 Any ten numbers in the interval $45.6375 \leq$ number < 45.6385.

14 a 25.246 **b** 25.247

  c No, because by rounding early, you lose accuracy.

  d By rounding at the end of a calculation and not during a calculation, you know the answer will be accurate.

Exercise 4.1

1 12, 23, 45, 176, 204, 498

2 a i 215 **ii** 34, 59, 70, 152, 215, 251

  b i 39 **ii** 39, 67, 88, 95, 101, 321

  c i 10.9 **ii** 6, 8.2, 10.9, 14.5, 67, 100.7

3 a, b 18.1, 18.3, 18.5, 18.6, 18.9

  c 9.2, 9.3, 9.5, 9.7, 9.8

  d 3.21, 3.32, 3.42, 3.56

4 6.08, 6.1, 6.21, 6.5

5 a 4.02, 4.21, 4.5, 4.67

  b 12.08, 12.3, 12.41, 12.9

6 a 3.5 **b** 214.92

  c 34.56 **d** 336.9

  e 0.22 **f** 5.41

  g 25.67 **h** 0.013

  i 0.009 **j** 0.049

7 a 9.58, 9.69, 9.72, 9.78, 9.79, 9.84

  b Asafa Powell

8 a < **b** > **c** < **d** >

  e > **f** < **g** > **h** >

9 a = b ≠ c ≠

    d = e = f ≠

10 a 2.66, 4.41, 4.46, 4.49

    b 0.52, 0.59, 0.71, 0.77

    c 6.09, 6.9, 6.92, 6.97

    d 5.199, 5.2, 5.212, 5.219

    e 42.4, 42.42, 42.441, 42.449

    f 9.04, 9.09, 9.7, 9.901, 9.99

11 a 0.081 m, 8.15 cm, 83 mm

    b 6.7 kg, 0.00672 t, 6750 g

    c 3455 mm, 346 cm, 0.00347 km, 3.48 m

12 a Any three numbers in the range
6.46 < number < 6.471.

    b 10

    c 6.461, 6.462, 6.463, 6.464, 6.465, 6.466,
6.467, 6.468, 6.469, 6.470

13 $2000 \div 1000$, 0.0208×100, 0.23×10,
$2320 \div 1000$, 1.9×10, $2110 \div 100$

Exercise 4.2

1 a 97 b 81 c 132

    d 439 e 598 f 363

2 a 5.5 b 9.1 c 15.2

    d 76.2 e 82.8 f 9.33

3 a 11.8 b 13.1

    c 18.2 d 3.79

4 a 36 b 28 c 815

    d 5.3 e 3.6 f 2.18

5 a 1.4 b 3.6 c 7.62

6 a 7.8 b 17.8 c 15.2

    d 5.4 e 11.2 f 7

7 a B b A

8 a 9.2 b 17.6 c 12.1

    d 4.4 e 5.1 f 4.7

9 a 7.82 b 13.32 c 30.18

    d 122.17 e 2.22 f 1.8

    g 19.08 h 39.04 i 20.73

10 a May b 8.98 kg

11 a 6.26 b 6.44

    c 27.817 d 14.339

12 a $4.10 b $0.90

13 a 6.55 m b 1.45 m

14 a −4.24 b −3.52 c −7.66

    d −5.827 e −12.29 f 12.27

15 a $37.62 + 28.53 = 66.15$

    b $84.56 - 28.59 = 55.97$

Exercise 4.3

1 a 8

    b 60, 0.6

    c 150, 15

    d 350, 35, 3.5

    e 1800, 180, 18, 1.8

    f 4200, 420, 42, 4.2

2 Learner's own answers.

3 b $2 \times 8 = 16$, so $0.2 \times 8 = 1.6$.

    c $4 \times 4 = 16$, so $0.4 \times 4 = 1.6$.

    d $7 \times 9 = 63$, so $0.7 \times 9 = 6.3$.

    e $5 \times 5 = 25$, so $0.5 \times 5 = 2.5$.

4 2.5, 3, 3.5, 4, 4.5, 5

5 a 22.4 b 9 c 7.2

    d 18.4 e 44.5 f 18.4

6 a 0.6 b 0.8 c 2.4

    d 3 e 4.9 f 4.8

7 a 0.18 b 1.8

    c 0.018 d 18

8 a 0.6 b 4 c 0.5

    d 6 e 3.8 f 0.4, 2

9 1.5 g

10 a 6608

    b i 660.8 ii 66.08 iii 6.608

      iv 660.8 v 66.08 vi 6.608

11 **a** 163.2, $5 \times 30 = 150$

    b 999.6, $2 \times 500 = 1000$

    c 22.72, $0.3 \times 70 = 21$

    d 361.95, $0.6 \times 600 = 360$

12 0.77 g

13 1415.25 kg

14 $1482.66

15 **a** 120.4   **b** 120.4

    c 120.4   **d** 1.204

Exercise 4.4

1 **a** 21   **b** 2.1   **c** 0.21

   d 14   **e** 1.4   **f** 0.14

2 **a** 2.1   **b** 2.3   **c** 1.3

   d 2.8   **e** 0.7

3 **a** 231   **b** 23.1   **c** 2.31

   d 352   **e** 35.2   **f** 3.52

4 **a** 4.13

   b 3.11

   c 1.21

   d 3.11

   e 9.01

5 **a** 1.232   **b** 3.172   **c** 1.122

6 **a** 1.176   **b** 1.279   **c** 1.117

   d 1.788   **e** 1.369   **f** 0.256

7 **a** 2.314   **b** 1.321

   c 5.569   **d** 0.122

8 $1.49

9 $1.26

10 **a** 3.226

    b 7.451

11 **a**

1	2	3	4	5	6	7	8	9
18	36	54	72	90	108	126	144	162

    b 13.456

    c $13.456 \times 18 = 242.208$

12 **a**

1	2	3	4	5	6	7	8	9
25	50	75	100	125	150	175	200	225

    b $32.32

    c $32.32 \times 25 = $808

13 It is better for Shaun to pay for his own food rather than a share of the bill. His own food costs $13.60 and an equal share of the bill is $13.72. He will save $0.12.

14 **a** Learner's own answer.

    b car A mean = 7.805 s, car B mean = 7.826 s

    c Learner's own answer.

15 **a** 148

    b 14.8

    c 1.48

    d 0.148

16 **a** 90   **b** 90

    c 9   **d** 900

17 **a** 1.2

    b 1.63

    c 0.414

18 $8\overline{)9\ \ {}^{1}2\ .\ {}^{4}9\ \ {}^{1}8\ \ {}^{2}4} = 11.623$

Exercise 4.5

1 A and v; B and vii, C and i; D and ix; E and ii; F and viii; G and iv; H and vi; I and iii

2 **a** 2, 2, 30 **b** 3, 10, 3, 7, 3, 21

   c 6, 10, 6, 10, 10, 6, 12, 6, 72

3 **a** 3, 3, 36 **b** 5, 100, 5, 9, 5, 45

   c 4, 100, 4, 100, 100, 4, 7, 4, 28

4 **a** 10   **b** 25   **c** 8

   d 24   **e** 26   **f** 11.5

5 **a** $23 - 2.3 = 20.7$

   b $57 - 5.7 = 51.3$

6 **a** 27, 20, 7, 60, 21, 81

   b 43, 40, 3, 280, 21, 301

7 **a** 252   **b** 200

   c 357   **d** 210

8 a

Item	Amount
Ayida	$0.4 \times \$650 = \$260$
Dayana	$0.6 \times \$650 = \$390$

b $260 + 390 = 650$

9 a 61.2

b 42.3

c 113.4

10 a 25.2

b 39

c 50.4

11 a $1.647 \div 3 = 0.549$

b $10, 10, 8.925 \div 7 = 1.275$

12 14.1 m

13 a $0.3816 \div 6 = 0.0636$

b $100, 100, 6.765 \div 5 = 1.353$

14 a **i** $18.57

   ii $19

b Answer from part **a ii** is the most suitable amount because $19 each will cover the bill plus a little extra, but $18.57 \times 40 = \$742.80$, which isn't enough to cover the bill.

15 61.0 kg

Exercise 7.1

1 a $27 \neq 29$ **b** $36 = 36$

  c $0.60 = 0.6$ **d** $5.50 \neq 5.55$

2 a $\frac{2}{3} = \frac{2 \times 3}{3 \times 3} = \frac{6}{9}$

  b $\frac{3}{5} = \frac{3 \times 2}{5 \times 2} = \frac{6}{10}$

  c $\frac{1}{2} = \frac{1 \times 7}{2 \times 7} = \frac{7}{14}$

3 a $\frac{2}{3} \neq \frac{7}{9}$ **b** $\frac{3}{5} = \frac{6}{10}$ **c** $\frac{1}{2} \neq \frac{8}{14}$

4 a $\frac{7}{3}$ $\rightarrow$ $7 \div 3 = 2\,r1$ $\rightarrow$ $\frac{7}{3} = 2\frac{1}{3}$

  b $\frac{15}{4}$ $\rightarrow$ $15 \div 4 = 3\,r3$ $\rightarrow$ $\frac{15}{4} = 3\frac{3}{4}$

  c $\frac{9}{5}$ $\rightarrow$ $9 \div 5 = 1\,r4$ $\rightarrow$ $\frac{9}{5} = 1\frac{4}{5}$

  d $\frac{7}{2}$ $\rightarrow$ $7 \div 2 = 3\,r1$ $\rightarrow$ $\frac{7}{2} = 3\frac{1}{2}$

5 a $\frac{7}{3} < 2\frac{2}{3}$ **b** $\frac{15}{4} > 3\frac{1}{4}$

  c $\frac{9}{5} > 1\frac{3}{5}$ **d** $\frac{7}{2} < 4\frac{1}{2}$

6 a $\frac{2}{3} > \frac{3}{5}$ **b** $\frac{2}{7} > \frac{1}{4}$

  c $\frac{7}{8} > \frac{5}{6}$ **d** $\frac{7}{11} < \frac{3}{4}$

7 a $\frac{1}{4} = \frac{2}{8}$

  b $\frac{4}{5} \neq \frac{9}{10}$

  c $\frac{2}{3} = \frac{10}{15}$

  d $\frac{8}{20} \neq \frac{3}{5}$

  e $\frac{20}{25} \neq \frac{3}{5}$

  f $\frac{16}{24} = \frac{2}{3}$

8 a $\frac{21}{4} < 5\frac{3}{4}$ **b** $4\frac{2}{7} > \frac{27}{7}$

  c $\frac{29}{3} > 9\frac{1}{3}$ **d** $5\frac{1}{8} < \frac{43}{8}$

9 a $\frac{17}{4} < 4\frac{1}{2}$ **b** $\frac{17}{6} > 2\frac{2}{3}$

  c $2\frac{3}{5} > \frac{38}{15}$ **d** $7\frac{5}{6} < \frac{95}{12}$

10 a $\frac{9}{2}$

  b $\frac{16}{3}$

  c $\frac{27}{5}$

11 a i $\frac{11}{8} = 1.375$

    ii $\frac{9}{7} = 1.2857$

   iii $\frac{15}{11} = 1.363$

  b $\frac{9}{7}, \frac{15}{11}, \frac{11}{8}$

12 $\frac{17}{5}, \frac{31}{9}, \frac{47}{13}, \frac{11}{3}$

13 $\frac{5}{9}, \frac{3}{5}, \frac{80}{21}, \frac{23}{6}$

14 a, b First card: $\frac{133}{28} < \text{fraction} < \frac{134}{28}$ or $\frac{266}{56} <$

    $\text{fraction} < \frac{268}{56}$; e.g. $\frac{267}{56}$

    Second card: $\frac{201}{42} < \text{fraction} < \frac{203}{42}$;

    e.g. $\frac{202}{42} = \frac{101}{21}$

15 a i $\frac{8}{9}, \frac{9}{10}$

    ii The fractions are getting bigger
because as the denominator is
increasing, so is the numerator and
the fractions are getting closer to 1.

  b i $\frac{128}{256}, \frac{256}{512}$
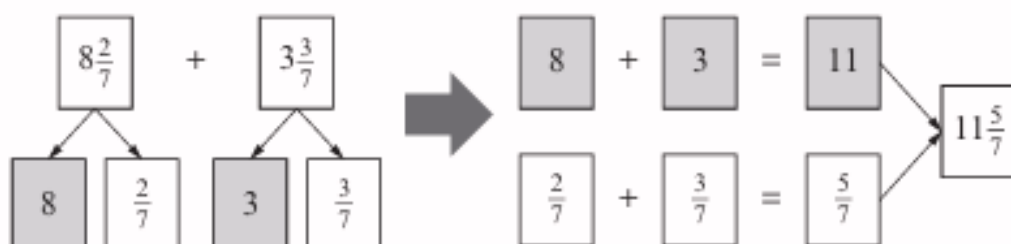
    ii The fractions aren't getting bigger or
smaller because they are all equivalent
to $\frac{1}{2}$.
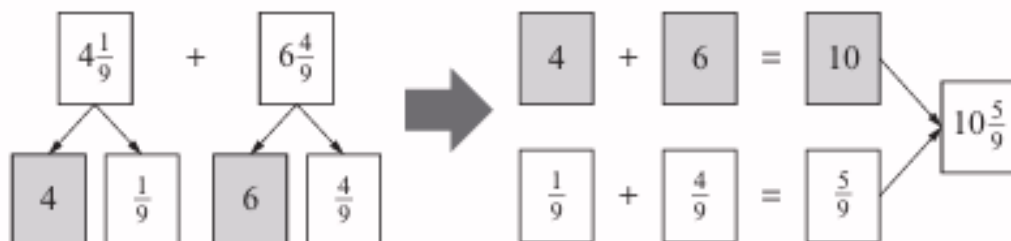
  c i $\frac{8}{13}, \frac{9}{12}$

    ii The fractions are getting bigger
because the numerator is increasing as
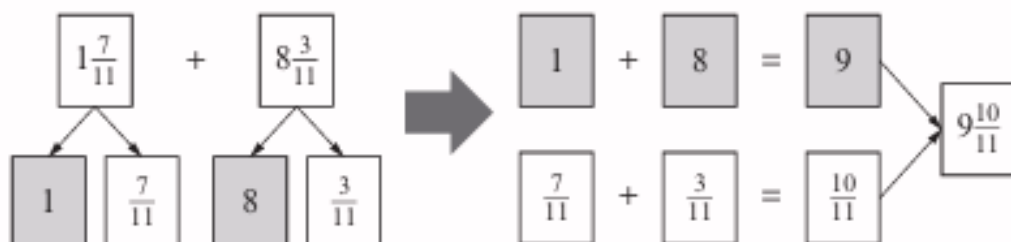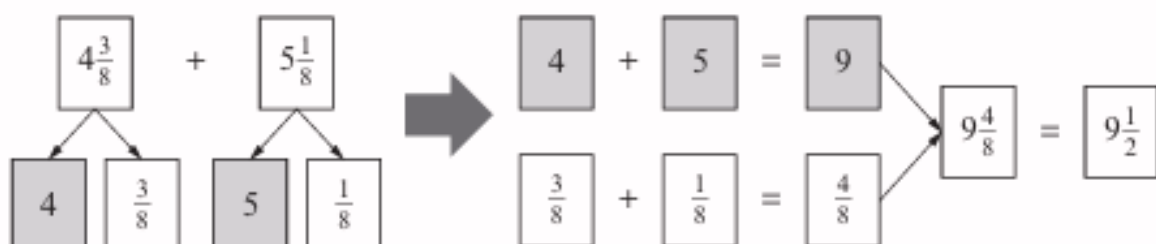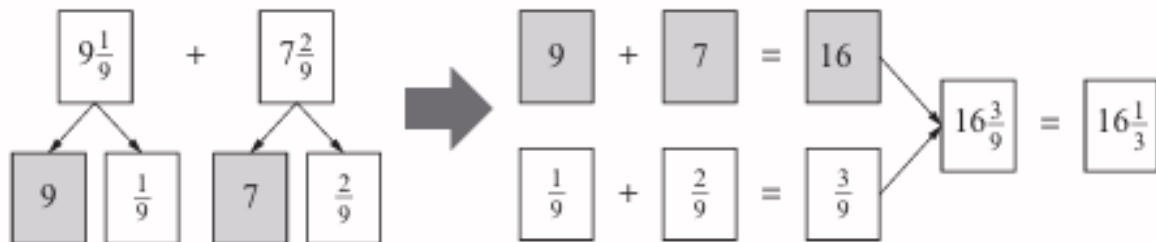the denominator is decreasing.

Exercise 7.2

1 a

$$8\frac{2}{7} + 3\frac{3}{7}$$

$8 \quad \frac{2}{7} \qquad 3 \quad \frac{3}{7}$

$$8 + 3 = 11$$

$$\frac{2}{7} + \frac{3}{7} = \frac{5}{7}$$

$$11\frac{5}{7}$$

b

$$4\frac{1}{9} + 6\frac{4}{9}$$

$4 \quad \frac{1}{9} \qquad 6 \quad \frac{4}{9}$

$$4 + 6 = 10$$

$$\frac{1}{9} + \frac{4}{9} = \frac{5}{9}$$

$$10\frac{5}{9}$$

c

$$1\frac{7}{11} + 8\frac{3}{11}$$

$1 \quad \frac{7}{11} \qquad 8 \quad \frac{3}{11}$

$$1 + 8 = 9$$

$$\frac{7}{11} + \frac{3}{11} = \frac{10}{11}$$

$$9\frac{10}{11}$$

2 a $1\frac{2}{3}$ **b** $3\frac{1}{2}$ **c** $6\frac{3}{4}$ **d** $9\frac{1}{3}$

3 a

$$4\frac{3}{8} + 5\frac{1}{8}$$

$4 \quad \frac{3}{8} \qquad 5 \quad \frac{1}{8}$

$$4 + 5 = 9$$

$$\frac{3}{8} + \frac{1}{8} = \frac{4}{8}$$

$$9\frac{4}{8} = 9\frac{1}{2}$$

b

$$9\frac{1}{9} + 7\frac{2}{9}$$

$9 \quad \frac{1}{9} \qquad 7 \quad \frac{2}{9}$

$$9 + 7 = 16$$

$$\frac{1}{9} + \frac{2}{9} = \frac{3}{9}$$

$$16\frac{3}{9} = 16\frac{1}{3}$$

c

$$3\frac{7}{10} + 6\frac{1}{10}$$

$3 \quad \frac{7}{10} \qquad 6 \quad \frac{1}{10}$

$$3 + 6 = 9$$

$$\frac{7}{10} + \frac{1}{10} = \frac{8}{10}$$

$$9\frac{8}{10} = 9\frac{4}{5}$$
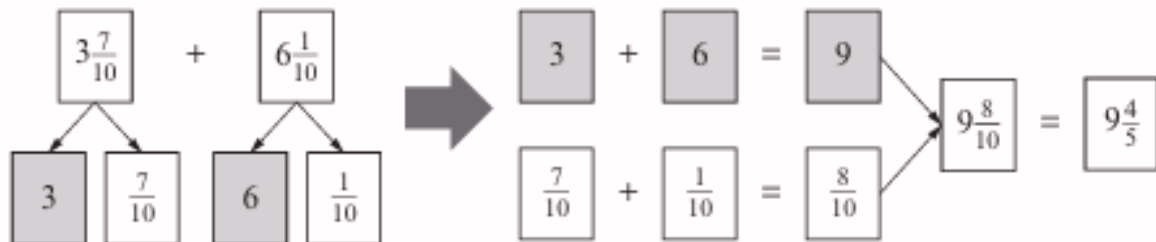
4 a i $1\frac{1}{3}$ **ii** $1\frac{1}{2}$ **iii** $1\frac{2}{5}$

b i $5\frac{1}{3}$ **ii** $9\frac{1}{2}$ **iii** $4\frac{2}{5}$

5 a

$2\frac{3}{5}$	$+$	$6\frac{4}{5}$
2 $\frac{3}{5}$		6 $\frac{4}{5}$

$2 + 6 = 8$

$\frac{3}{5} + \frac{4}{5} = \frac{7}{5} = 1\frac{2}{5}$

$9\frac{2}{5}$

b

$1\frac{5}{7}$	$+$	$3\frac{6}{7}$
1 $\frac{5}{7}$		3 $\frac{6}{7}$

$1 + 3 = 4$

$\frac{5}{7} + \frac{6}{7} = \frac{11}{7} = 1\frac{4}{7}$

$5\frac{4}{7}$

c

$4\frac{5}{9}$	$+$	$7\frac{8}{9}$
4 $\frac{5}{9}$		7 $\frac{8}{9}$

$4 + 7 = 11$

$\frac{5}{9} + \frac{8}{9} = \frac{13}{9} = 1\frac{4}{9}$

$12\frac{4}{9}$
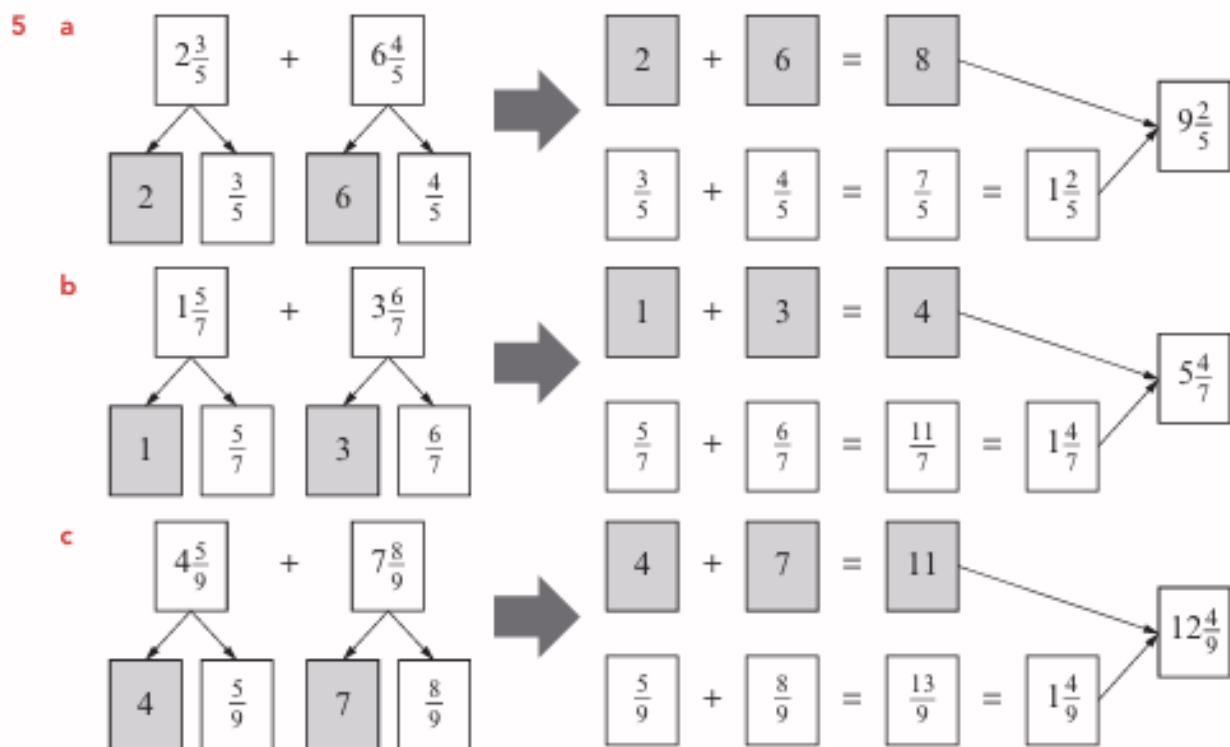
6 a $7\frac{4}{9}$ **b** $7\frac{2}{5}$ **c** $10\frac{1}{13}$ **d** $10\frac{1}{4}$

7 $16\frac{3}{7}$m

8 a $10\frac{3}{4}$ **b** $7\frac{7}{8}$ **c** $14\frac{2}{9}$ **d** $10\frac{1}{4}$

9 a $32\frac{3}{8}$km

 b Yes, because $32\frac{1}{4} = 32\frac{2}{8}$ and $32\frac{3}{8} > 32\frac{2}{8}$.

10 $16\frac{3}{10}$km

11 $14\frac{13}{24}$ kg

12 a Step 2: $\frac{9}{13} = \frac{45}{65}$ not $\frac{35}{65}$ and $\frac{4}{5} = \frac{52}{65}$ not $\frac{54}{65}$.
  Also $\frac{89}{65} = 1\frac{24}{65}$ not $1\frac{25}{65}$.

 b $8\frac{32}{65}$

13 middle row: left $13\frac{7}{15}$, right $16\frac{5}{21}$;
  top row: $29\frac{74}{105}$

14 a $7\frac{3}{4}x$ **b** $10\frac{1}{12}y + 6\frac{1}{2}x$

 c $5\frac{1}{3}a + 8\frac{5}{24}b$

15 $151\frac{1}{20}$ cm

16 Yes; perimeter triangle $= 13\frac{7}{36}$, quadrilateral
  $= 13\frac{4}{9} = 13\frac{16}{36}$ and $13\frac{16}{36} - 13\frac{7}{36} = \frac{1}{4}$cm.

Exercise 7.3

1 a $\frac{1}{4}$ **b** $\frac{1}{6}$ **c** $\frac{1}{8}$

2 a $\frac{1}{10}$ **b** $\frac{1}{12}$ **c** $\frac{1}{14}$

 d $\frac{1}{15}$ **e** $\frac{1}{18}$ **f** $\frac{1}{21}$

3 a true **b** false, $\frac{1}{20}$

 c false, $\frac{1}{25}$ **d** true

4 a $\frac{3}{8}$ **b** $\frac{5}{12}$ **c** $\frac{3}{10}$

 d $\frac{2}{15}$ **e** $\frac{5}{18}$ **f** $\frac{5}{21}$

5 a $\frac{2}{5}$ **b** $\frac{1}{2}$ **c** $\frac{6}{25}$ **d** $\frac{5}{21}$

6 a $\frac{1}{12}$ **b** $\frac{9}{16}$ **c** $\frac{5}{42}$

 d $\frac{9}{20}$ **e** $\frac{6}{35}$ **f** $\frac{5}{12}$

7 a $\frac{2}{5}$ **b** $\frac{2}{5}$ **c** $\frac{3}{10}$

d $\frac{1}{2}$ **e** $\frac{7}{11}$ **f** $\frac{2}{5}$

8 $\frac{5}{44}$ m²

9 $\frac{4}{25}$ m²

10 a $\frac{3}{8}$ **b** $\frac{3}{5}$

c $\frac{1}{4}$ **d** $\frac{3}{8}$

11 a $\frac{3}{28}$

b $\frac{5}{28}$

c $\frac{5}{7}$

12 a $\frac{3}{7}$ **b** $\frac{2}{7}$

13 a <u>Estimate</u> $\frac{5}{7}$ is greater than $\frac{1}{2}$, but is less than 1

$\frac{1}{2}$ of $\frac{1}{10}$ is $\frac{1}{20}$ and $1 \times \frac{1}{10} = \frac{1}{10}$.

So, the answer to $\frac{5}{7} \times \frac{1}{10}$ must be greater than $\frac{1}{20}$ but smaller than $\frac{1}{10}$.

<u>Accurate</u> $\frac{5}{7} \times \frac{1}{10} = \frac{5 \times 1}{7 \times 10} = \frac{5}{70} = \frac{1}{14}$

$\frac{1}{14}$ is greater than $\frac{1}{20}$ but is smaller than $\frac{1}{10}$. ✓

b <u>Estimate</u> $\frac{2}{5}$ is greater than zero, but is less than $\frac{1}{2}$.

$0 \times \frac{1}{6} = 0$ and $\frac{1}{2}$ of $\frac{1}{6}$ is $\frac{1}{12}$.

So, the answer to $\frac{2}{5} \times \frac{1}{6}$ must be greater than zero but is smaller than $\frac{1}{12}$.

<u>Accurate</u> $\frac{2}{5} \times \frac{1}{6} = \frac{2 \times 1}{5 \times 6} = \frac{2}{30} = \frac{1}{15}$

$\frac{1}{15}$ is greater than zero but is smaller than $\frac{1}{12}$. ✓

14 a Any one of the following:

$\frac{3}{5} \times \frac{9}{10} = \frac{27}{50}$, $\frac{3}{5} \times \frac{4}{7} = \frac{12}{35}$, $\frac{3}{5} \times \frac{7}{8} = \frac{21}{40}$, $\frac{9}{10} \times \frac{4}{7} = \frac{18}{35}$,

$\frac{9}{10} \times \frac{7}{8} = \frac{63}{80}$, $\frac{4}{7} \times \frac{7}{8} = \frac{1}{2}$

b i $\frac{9}{10} \times \frac{7}{8} = \frac{63}{80}$ **ii** $\frac{3}{5} \times \frac{4}{7} = \frac{12}{35}$

c i Multiply together the two largest fractions.

ii Multiply together the two smallest fractions

15 a $\frac{1}{3}$ **b** $\frac{1}{4}$ **c** $\frac{1}{5}$

d $\frac{1}{6}$ **e** $\frac{1}{7}$

f

Part	Question	Answer
i	$\frac{1}{2} \times \frac{2}{3}$	$\frac{1}{3}$
ii	$\frac{1}{2} \times \frac{2}{3} \times \frac{3}{4}$	$\frac{1}{4}$
iii	$\frac{1}{2} \times \frac{2}{3} \times \frac{3}{4} \times \frac{4}{5}$	$\frac{1}{5}$
iv	$\frac{1}{2} \times \frac{2}{3} \times \frac{3}{4} \times \frac{4}{5} \times \frac{5}{6}$	$\frac{1}{6}$
v	$\frac{1}{2} \times \frac{2}{3} \times \frac{3}{4} \times \frac{4}{5} \times \frac{5}{6} \times \frac{6}{7}$	$\frac{1}{7}$

g The answer always has a numerator of 1 and the denominator is the same as the final fraction in the list.

h i $\frac{1}{8}$ **ii** $\frac{1}{11}$

16 Three examples are: $\frac{1}{2} \times \frac{2}{5}$, $\frac{1}{3} \times \frac{3}{5}$, $\frac{1}{4} \times \frac{4}{5}$.

17 $\frac{3}{80}$

18 $2\frac{1}{4}$ m²

Exercise 7.4

1 a $\frac{3}{4}$ **b** $\frac{4}{5}$ **c** $\frac{5}{6}$ **d** $\frac{6}{7}$

2 a true **b** false, $\frac{8}{9}$ **c** true

3 a $\frac{5}{12}$ **b** $\frac{5}{8}$ **c** $\frac{15}{16}$ **d** $\frac{9}{22}$

4 a $\frac{1}{2}$ **b** $\frac{2}{5}$ **c** $\frac{7}{8}$ **d** $\frac{3}{4}$

5 a $\frac{1}{2}$ **b** $\frac{2}{5}$ **c** $\frac{7}{8}$ **d** $\frac{3}{4}$

6 a $\frac{3}{4}$ b $\frac{5}{12}$ c $\frac{6}{7}$

   d $\frac{35}{54}$ e $\frac{18}{25}$ f $\frac{7}{30}$

7 a $1\frac{1}{2}$ b $1\frac{1}{20}$ c $1\frac{1}{6}$

   d $1\frac{5}{9}$ e $4\frac{7}{12}$ f $2\frac{10}{21}$

8 a $1\frac{1}{4}$ b $1\frac{1}{3}$ c $1\frac{1}{2}$

   d $\frac{3}{5}$ e 3 f $4\frac{2}{3}$

9 a Nova has forgotten to turn her second fraction upside down.

   b $1\frac{1}{20}$

10 $\frac{8}{9}$ m

11 middle row: left $\frac{4}{7}$, right $\frac{3}{8}$; top row: $1\frac{11}{21}$

12 $\frac{9}{16}$

13 $\frac{3}{7}$ m

14 a

Pattern	Working	Answer
$\frac{1}{2} \div \frac{2}{3}$	$\frac{1}{2} \div \frac{2}{3} = \frac{1}{2} \times \frac{3}{2} = \frac{3}{4}$	$\frac{3}{4}$
$\frac{2}{3} \div \frac{3}{4}$	$\frac{2}{3} \div \frac{3}{4} = \frac{2}{3} \times \frac{4}{3} = \frac{8}{9}$	$\frac{8}{9}$
$\frac{3}{4} \div \frac{4}{5}$	$\frac{3}{4} \div \frac{4}{5} = \frac{3}{4} \times \frac{5}{4} = \frac{15}{16}$	$\frac{15}{16}$
$\frac{4}{5} \div \frac{5}{6}$	$\frac{4}{5} \div \frac{5}{6} = \frac{4}{5} \times \frac{6}{5} = \frac{24}{25}$	$\frac{24}{25}$
$\frac{5}{6} \div \frac{6}{7}$	$\frac{5}{6} \div \frac{6}{7} = \frac{5}{6} \times \frac{7}{6} = \frac{35}{36}$	$\frac{35}{36}$

   b bigger

   c No; the numerator is always one less than the denominator, so it will never be 1 because the numerator will never be the same as the denominator.

15 $\frac{2}{3}$ m

16 a $\frac{7}{88}$ m   b $\frac{16}{33}$ m

Exercise 7.5

1 a i $6 = 2 \times 3$ ii $4 = 2 \times 2$

     iii $10 = 2 \times 5$ iv $9 = 3 \times 3$

     v $15 = 3 \times 5$ vi $14 = 2 \times 7$

   b i $\frac{1}{6} = \frac{1}{2} \times \frac{1}{3}$ ii $\frac{1}{4} = \frac{1}{2} \times \frac{1}{2}$

     iii $\frac{1}{10} = \frac{1}{2} \times \frac{1}{5}$ iv $\frac{1}{9} = \frac{1}{3} \times \frac{1}{3}$

     v $\frac{1}{15} = \frac{1}{5} \times \frac{1}{3}$ vi $\frac{1}{14} = \frac{1}{2} \times \frac{1}{7}$

2 a 9   b 30   c 15

   d 14   e 30

3 Learner's choice of calculation:

   a A 32 or B 48   b A 28 or B 21

   c A 30 or B 18   d A 42 or B 18

4 a 16   b 7

   c 6   d 6

5 $\frac{1}{5} = \frac{2}{10}, \frac{2}{5} = \frac{4}{10}, \frac{3}{5} = \frac{6}{10}, \frac{4}{5} = \frac{8}{10}$

6 a 18   b 32   c 42   d 48

7 a 26   b 27   c 27   d 14

8 34

9 a Yes, Zara is correct.

   b 37.5

10 a 54   b 128   c 132

11 656

12 a 105   b 225   c 105

13 a $\frac{7}{24}$ b $\frac{6}{11}$ c $\frac{8}{23}$

14 No, Seb has changed 14 to 7×7 instead of 7×2.

The solution should be:

$$\frac{7}{25} \times \frac{9}{14} = \frac{7 \times 9}{25 \times 14} = \frac{7 \times 9}{25 \times 7 \times 2} = \frac{9 \times 7}{25 \times 2 \times 7} = \frac{9 \times 7}{50 \times 7} = \frac{9}{50} \times \frac{7}{7}$$
$$= \frac{9}{50} \times 1 = \frac{9}{50}$$

15 a 240   b 500   c 560   d 870

16 a $1\frac{3}{10}$ b $\frac{11}{36}$ c $1\frac{2}{15}$

17 a $\frac{8}{9} \times 720 = 640$

b $\frac{11}{12} \times 840 = 770$

c $\frac{19}{20} \times 800 = 760$

18 a Learner's own answers.

b Another alternative method is to use
$\frac{4}{5} = \frac{8}{10}$. Then work out $300 \times \frac{8}{10} = 240$, then
$240 \times \frac{8}{10} = 192$.

c **i** 64   **ii** 72

d **i** 320   **ii** 120