Chapter 4

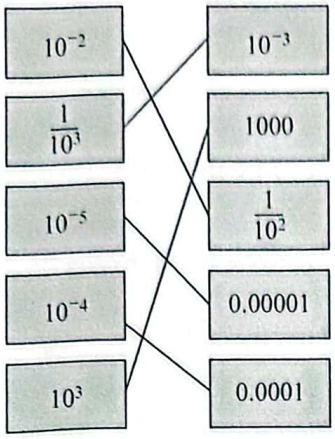
Check in

1 **a** 10^{11} **b** 0.01 **c** 10^{5}

2 **a** 134.56 **b** 38 **c** 0.007 79

Exercise 4A

1



2 **a** 7000 **b** 28 000 **c** 43 000 **d** 7100

3 **a** 8.03 **b** 0.42 **c** 5.1 **d** 958

4 **a** 1000; 1000; 0.8 **b** 2; 100; 100; 35

c 10^{5}; 100 000; 72 **d** 10^{1}; 10; 0.2

5 **a** $\frac{1}{100}$; 100; 7.4

b 5; 100 000; 100 000; 800

c 3; 1000; 1000; 2145

d 1; 10, 10, 3

6 **a** 100 **b** 1000

c dividing; 10 000 **d** multiplying; 100 000

7 **a** 0.9 **b** 0.287 **c** 8.63 **d** 0.046

8 **a** 48 **b** 210 **c** 60 **d** 14.3

9 **a** 3400 **b** 7.13 **c** 8.1 **d** 70

10 One possible solution is

$7 \times \boxed{10^{2}} = 7 \div \boxed{0.01}$

$5.2 \div \boxed{1000} = 5.2 \times \boxed{10^{-3}}$

11 **a** $7.1 \times 10^{5} = 710\,000$

b $249\,000 \div 10^{3} = 249$

c $60\,000 \times 10^{-4} = 6$

d $0.02 \div 10^{-2} = 2$

e $2.84 \times 10^{3} = 2840$

f $44\,000 \div 10^{4} = 4.4$

g $230 \times 10^{-2} = 2.3$

h $0.007 \div 10^{-6} = 7000$

12 **a** 706 000 **b** 78 460 **c** 109 000 **d** 47

Exercise 4B

1 **a** 2×10^{3} **b** 4×10^{2} **c** 8×10^{1}
d 9×10^{4} **e** 4×10^{3} **f** 7×10^{5}
g 3×10^{6} **h** 4×10^{7} **i** 1×10^{5}

2 **a** 300 **b** 5000 **c** 600 000
d 20 000 000 **e** 3 000 000 **f** 4 000 000 000

3 **a** 4.2×10^{2} **b** 6.3×10^{3} **c** 1.7×10^{5}
d 2.3×10^{4} **e** 6.13×10^{4} **f** 9.23×10^{3}
g 4.16×10^{2} **h** 9.81×10^{4} **i** 6.31×10^{6}

4 No, as 62 is not between 1 and 10. It should be 6.2×10^6

5 **a** 7×10^3 **b** 6.34×10^4 **c** 8.7×10^4
d 5×10^1

6 **a** 1600 **b** 280 **c** 381
d 475 000 **e** 301 000 000 **f** 1 600 000 000

7 **a** 54.3 is not between 1 and 10
b 0.03 is not between 1 and 10
c Need a single power of 10

8 1.404×10^{10}

9 9.46×10^{17}

10 **a** 5.43×10^8 **b** 3×10^6 **c** 7.1×10^5

Exercise 4C

1 **a** 0.06 **b** 0.4 **c** 0.008 **d** 0.0005
e 0.000 002 **f** 0.000 07

2 **a** 6.3×10^{-1} **b** 7.4×10^{-3}
c 2.8×10^{-2} **d** 1.3×10^{-4}
e 2.356×10^{-2} **f** 8.2×10^{-4}
g 3.91×10^{-6} **h** 1.6×10^{-3}
i 3.83×10^{-3}

3 **a** 3.06×10^{-5} **b** 4.925×10^{-7}
c 4.2831×10^{-3} **d** 9.01×10^{-4}
e 2.5×10^{-10} **f** 8.46×10^{-8}
g 8.6×10^{-8} **h** 3.675×10^{-12}

4 No, standard form should have a multiplication sign not a division sign, it should be 8×10^{-3}

5 **a** 2×10^{-3} **b** 7.2×10^{-2} **c** 8.6×10^{-2} **d** 2×10^{-11}

6 9×10^{-11} g

7 **a** 2.4×10^{12} **b** 4.1×10^9 **c** 9×10^{-3} **d** 3.2×10^{-3}

Exercise 4D

1 **a** 243, 238, 235 **b** 235, 245

2 **a** yes **b** no
c If you round to 1 d.p. this is the same as rounding to the nearest 0.1 so halve this value.
d See what rounding to 2 s.f. is equivalent to; it might be equivalent to rounding to the nearest 100, or nearest whole number. Once you have worked that out you can use the same method.

3

Number, n	Rounded correct to	Bounds
340	nearest 10	$335 \leq n < 345$
4500	nearest 100	$4450 \leq n < 4550$
7000	nearest 1000	$6500 \leq n < 7500$
42 000	nearest 1000	$41\,500 \leq n < 42\,500$
83 200	nearest 100	$83\,150 \leq n < 83\,250$
690	nearest 10	$685 \leq n < 695$

4 **a** These are the bounds if the number had been rounded to the nearest 100.
b $4795 \leq n < 4805$

5

Number, n	Rounded correct to	Bounds
0.7	1 d.p.	$0.65 \leq n < 0.75$
3.78	2 d.p.	$3.775 \leq n < 3.785$
3400	2 s.f.	$3350 \leq n < 3450$
4000	1 s.f.	$3500 \leq n < 4500$

6 Any number in the interval $524 < x < 525$, e.g. 524.5

7 $827.5 \leq h < 828.5$

8 **a** could be true

b definitely false

c could be true

9 $325 \leq n < 375$

10 **a** $22.5 \leq n < 27.5$ **b** $67\,250 \leq n < 67\,750$

c $7.25 \leq n < 7.75$ **d** $270 \leq n < 290$

11 28 cm