1 Arithmetic and numerical computation

Expressions in decimal and ordinary form

Guided questions

1 Step 1: 3.418 g

Step 2: the number after the underlined number is 8 (above 5) so the rule 'if the next number is **5 or more**, round up' is followed.

The answer is 3.42 g (to 2 d.p.).

2 **a** Step 1: subtract the mass of the evaporating basin from the mass of the evaporating basin + anhydrous solid.

27.799 − 26.250 = 1.549 g

Step 2: underline the numbers up to two numbers after the decimal point.

1.549

Step 3: 1.549 g

The next number is 9, which is greater than 5, so round up. The answer is 1.55 g.

b Step 1 and 2:

28.465 − 27.799 = 0.666 g

Step 3: the next number is 6 (greater than 5) so round up to 0.67 g.

3 Step 1: pH = −log 0.2 = − (−0.698970004) = 0.698970004

Step 2: pH = 0.698970004

Step 3: the number after the second decimal place is 8 so round up. The answer is 0.70.

Practice questions

4 **a** 1.72 g which is 1.7 g to 1 decimal place.

b 9.69 g which is 9.7 g to 1 decimal place.

c 2.11 g which is 2.1 g to 1 decimal place.

5 Table 1.2

Mass (g)	Mass recorded to two decimal places (g)
29.883	29.88
0.046	0.05
32.6789	32.68
13.999	14.00
0.0894	0.09
19 992.456	19 992.46

6 **a** 0.7

b 1.3

c −0.3

d 2.3

e 1.7

Guided question

1 Step 1:

Table 1.4

Temperature/°C	Number of decimal places
10.2	1
10	0
10.3	1
11	0

Step 2: the answer should be recorded to 0 decimal places.

Step 3: Average $= \frac{10.2 + 10 + 10.3 + 11}{4} = 10.375 = 10.0$ (0 d.p.)

Practice question

2 Table 1.5

Mass of evaporating basin (g)	Mass of evaporating basin and solid (g)	Mass of solid (to appropriate number of decimal places) (g)
34.567	23.4	11.2 (1 d.p.)
29.93	25.66	4.27 (2 d.p.)
25.49	22.1	3.4 (1 d.p.)
18.456	11.9	6.6 (1 d.p.)

3 **a** 53.667 g is the total. The number with the least decimal places is 43.2 g with one decimal place hence the answer must be rounded to one decimal place i.e. 53.7 g.

b 13.128 g is the total. The number with the least decimal places is 2.49 g with two decimal places hence the answer must be rounded to two decimal places i.e. 13.13 g.

c 7.5439 g is the total. The number with the least decimal places is 3.23 or 3.97 with two decimal places hence the answer must be rounded to two decimal places i.e. 7.54 g.