# Answers - Place value, ordering and rounding

Year: Year 7

## Answer to Question 1

a. **4 206 035**
b. Three million, seventy thousand, four hundred and nine.
c. The 7 is in the hundred-thousands column: **700 000**.
d. The 4 is in the hundredths column: **0.04**.
e. Write with 3 decimal places: 6.090, 6.900, 6.089, 6.190. Order: **6.089, 6.09, 6.19, 6.9**.

## Answer to Question 2

a. Multiplying by 100 moves every digit two places to the left: $36.4 \times 100 =$**3 640**.
b. Multiplying by 1 000 moves the digits three places to the left: $0.0725 \times 1000 =$ **72.5**.
c. Dividing by 10 moves the digits one place to the right: $4580 \div 10 =$**458**.
d. Dividing by 1 000 moves the digits three places to the right: $93 \div 1000 =$**0.093**.
e. Multiplying by 0.01 is the same as dividing by 100: $2.5 \div 100 =$**0.025**.

In every case the decimal point stays still and the digits move; we add zeros as place holders where needed.

## Answer to Question 3

a. Look at the ones digit, 3, which is less than 5, so round down: **4 860**.
b. Look at the tens digit, 6, which is 5 or more, so round up: **4 900**.
c. Look at the hundreds digit, 8, so round up: **5 000**.
d. The hundreds digit is 4, so round down: **25 000**. Only the digit straight after the rounding place matters.
e. The thousands digit is 9, so 34 rounds up to 35 ten-thousands: **350 000**.

## Answer to Question 4

For decimal places, count digits after the point. For significant figures, start counting at the first non-zero digit. In both cases look at the next digit to decide whether to round up.

a. **7.8**
b. **7.85**

c. **0.10** (the 5 in the third decimal place makes 0.095 round up to 0.10)
d. **0.1**
e. **13 000** (the third digit is 8, so round 12 up to 13)

## Answer to Question 5

To order decimals, give them all the same number of decimal places by adding zeros, then compare them like whole numbers. For negative numbers, the further from zero, the smaller.

a. Write all to 3 d.p.: 3.400, 3.040, 3.440, 3.404, 3.000. Order: **3.0, 3.04, 3.4, 3.404, 3.44**.
b. **0.07, 0.077, 0.7, 0.707, 0.77**
c. **-12, -5, -1, 0, 3, 8**

## Answer to Question 6

a. $48 \approx 50$ and $52 \approx 50$: estimate $50 \times 50 =$**2 500**. Exact 2 496, very close.
b. $3.9 \approx 4$ and $7.1 \approx 7$: estimate $4 \times 7 =$**28**. Exact 27.69.
c. $612 \approx 600$ and $29 \approx 30$: estimate $600 \div 30 =$**20**. Exact about 21.1.
d. $198 \approx 200$ and $4.9 \approx 5$: estimate $200 \times 5 =$**1 000**. Exact 970.2.

In each case the estimate is close to the exact answer, which shows that the calculator answer is sensible.

## Answer to Question 7

a. Belfast (343 500), Cardiff (362 400), Edinburgh (506 500), Leeds (812 000).
b. Cardiff 400 000, Edinburgh 500 000, Belfast 300 000, Leeds 800 000.
c. Cardiff 360 000, Edinburgh 510 000, Belfast 340 000 (the thousands digit 3 rounds down), Leeds 810 000.
d. 506 500 rounds to 500 000 to the nearest 100 000, so yes, **about half a million** is a good description.

## Answer to Question 8

a. Match C: 60 004.
b. 45 000; 39 000; 60 000; 27 000; 53 000.
c. A: 50 000, B: 40 000, C: 60 000, D: 30 000, E: 50 000. Matches **A and E** are both 50 000.
d. Estimate: $50 + 40 + 60 + 30 + 50 = 230$, so 230 000. Exact: $45218 + 38906 + 60004 + 27495 + 52780 = 224403$, which is **220 000** to the nearest 10 000.

## Answer to Question 9

a. £35, £4, £3, £10.
b. $35 + 4 + 3 + 10 =$**£52**.
c. $34.95 + 4.49 + 2.99 + 9.85 =$**£52.28**.
d. The exact total is £52.28, which is less than £55, so she has enough and the estimate was good (the difference is only 28p).

Rounding to the nearest pound is reliable here because the estimate (£52) is £3 below Ella's £55; if the estimate had been very close to £55, she would have needed the exact total.

## Answer to Question 10

a. Three hundred and eighty-four thousand, four hundred kilometres. One hundred and forty-nine million, six hundred thousand kilometres.
b. 380 000 km and 150 000 000 km.
c. $150000000 \div 380000 = 394.7$, which is about 400. Dan is right.
d. $150000000 \div 300000 =$**500 seconds** (about 8 minutes).

Dividing the rounded values is much easier than dividing the exact distances, and the answer is still accurate enough to check Dan's statement.

## Answer to Question 11

a. 12.3, 12.349, 12.35, 12.4.
b. 12.35 and 12.3.
c. 12.35 rounds up to 12.4 and 12.4 stays 12.4, so these two round to **12.4**. (12.349 and 12.3 both round to 12.3.)
d. It shows more decimal places, so it measures to the nearest thousandth of a gram rather than the nearest tenth.

## Answer to Question 12

a. 342 rounds to **300**, 48 rounds to **50** and £6.60 rounds to **£7** (1 significant figure each).
b. Gallons = distance ÷ miles per gallon: $300 \div 50 =$**6 gallons**.
c. Cost = gallons × price: $6 \times 7 =$**£42**.
d. $342 \div 48 = 7.125$, which is **7.1 gallons** to 1 d.p. The estimate was low because 342 was rounded down a lot.

## Answer to Question 13

a. The fastest swimmer has the smallest time: **31.09, 31.4, 31.46, 31.5** seconds (compare 31.090, 31.400, 31.460, 31.500).
b. Look at the hundredths digit: 31.46 rounds to **31.5**, 31.5 stays **31.5**, 31.09 rounds to **31.1** and 31.4 stays **31.4**.
c. The swimmers with 31.46 s and 31.5 s both show **31.5 s** after rounding, even though one was faster. This is why races are timed to the hundredth of a second.

## Answer to Question 14

a. $3.76 \times 1000 =$**3 760 MB**
b. Ben: 4 096 MB is more than 3 760 MB, so **Ben**.
c. 4.096 GB rounds to **4 GB**.
d. Total plan 5000 MB. Ava: $5000 - 3760 = 1240$ MB. Ben: $5000 - 4096 = 904$ MB.

Always change both amounts into the same unit before comparing: here 3 760 MB and 4 096 MB.

## Answer to Question 15

a. Ali 248, Beth 252, Chen 48, Dee 52, Eve 98.
b. Chen (difference 48).
c. The real number to the nearest hundred is 2 700, so **Chen**.
d. 2% of 2748 is about 55. 48 is less than 55, so Chen is right.

The estimate of 2% uses $2748 \approx 2750$, and 1% of 2 750 is 27.5, so 2% is 55.

## Answer to Question 16

a. 4 200 + 3 900 + 5 000 + 3 000 = 16 100 (rounding 5 020 to 5 000).
b. 4 150 + 3 875 + 5 020 + 2 960 = **16 005**.
c. About $16000 \times 3 = 48000$.
d. $48000 \div 62500 = 0.768$, about **80%**.

Rounding the number of spaces to 16 000 and multiplying by 3 gives a quick estimate; the exact figure would be $16005 \times 3 = 48015$.

## Answer to Question 17

a. Tom ignored the 5 in the third decimal place. The 5 means round up, so the answer is **6.40**.
b. The first significant figure is 4 (0.04). The next digit is 0 so round down: **0.04**.
c. The hundreds digit is 6, so round up: **46 000**.
d. The digit after the first decimal place is 6, so round up. 9.96 gives **10.0**.

## Answer to Question 18

a. Look at the units digit of the pounds: **£1 250, £880, £1 030, £560, £1 400**.
b. $1250 + 880 + 1030 + 560 + 1400 =$**£5 120**.
c. Line up the decimal points and add:
$1248.50 + 876.25 + 1034.80 + 562.10 + 1399.95 =$**£5 121.60**.
d. **Yes**: £5 121.60 is more than £5 000 by £121.60, which agrees with the estimate.
e. The first two significant figures are 5 and 1; the next digit is 2, so round down: **£5 100**.

## Answer to Question 19

a. Compare the values: **September (89.4), December (98.6), October (112.75), November (131.08)**.
b. Look at the first decimal place: **89, 113, 131, 99** (98.6 rounds up to 99).
c. Two significant figures: **89, 110, 130, 99**. For 112.75 the third figure is 2, so round down to 110.
d. $89.4 + 112.75 + 131.08 + 98.6 =$**431.83 mm**. 430 mm is within 2 mm of the exact total, so it is a sensible estimate.

## Answer to Question 20

a. 1p: 187p. 2p: 192p. 5p: 715p. 10p: 620p.
b. Total $187 + 192 + 715 + 620 = 1714$p = **£17.14**.
c. **£17**.
d. 190×1 + 100×2 + 140×5 + 60×10 = 190 + 200 + 700 + 600 = 1690p = **£16.90**.

The estimate (£16.90) is close to the exact total (£17.14), so rounding the numbers of coins was a good quick check.

## Answer to Question 21

a. Rounding to 4.57 means from 4.565 up to just below 4.575. Smallest is **4.565**.
b. Largest with 3 d.p. is **4.574**.
c. $4.565 \leq x$.
d. No. Every number from 4.565 to 4.574 rounds to 4.6 to 1 d.p., so 4.5 is impossible.

The lower limit 4.565 is included because it rounds up, but 4.575 is not, because it would round up to 4.58.