Answers - Written addition and subtraction to 4 digits

Year: Year 4

Answer to Question 1

a. Ones: 4 + 5 = 9, write 9. Tens: 1 + 2 = 3, write 3. Hundreds: 3 + 4 = 7, write 7. Thousands: 2 + 1 = 3, write 3. Answer: **3 739**. Estimate: 2 300 + 1 400 = 3 700, so the answer is sensible.
b. Ones: 7 + 5 = 12, write 2 and carry 1. Tens: 4 + 8 + 1 (carried) = 13, write 3 and carry 1. Hundreds: 6 + 1 + 1 (carried) = 8, write 8. Thousands: 3 + 2 = 5, write 5. Answer: **5 832**. Estimate: 3 600 + 2 200 = 5 800, so the answer is sensible.
c. Ones: 8 + 3 = 11, write 1 and carry 1. Tens: 5 + 6 + 1 (carried) = 12, write 2 and carry 1. Hundreds: 9 + 7 + 1 (carried) = 17, write 7 and carry 1. Thousands: 4 + 1 + 1 (carried) = 6, write 6. Answer: **6 721**. Estimate: 5 000 + 1 800 = 6 800, so the answer is sensible.
d. Ones: 5 + 6 = 11, write 1 and carry 1. Tens: 8 + 7 + 1 (carried) = 16, write 6 and carry 1. Hundreds: 0 + 9 + 1 (carried) = 10, write 0 and carry 1. Thousands: 6 + 2 + 1 (carried) = 9, write 9. Answer: **9 061**. Estimate: 6 100 + 3 000 = 9 100, so the answer is sensible.

Answer to Question 2

a. Ones: 2 is less than 8, so exchange 1 ten for 10 ones (the tens digit changes from 7 to 6). Now 12 − 8 = 4. Tens: 6 − 1 = 5. Hundreds: 4 − 3 = 1. Thousands: 5 − 2 = 3. Answer: **3 154**. Check: 3 154 + 2 318 = 5 472.
b. Ones: 5 is less than 8, so exchange across the zero (the next digit is 0): take 1 from the hundreds column (2 becomes 1); each zero on the way becomes 9 and the ones column gains 10. Now 15 − 8 = 7. Tens: 9 − 4 = 5. Hundreds: 1 is less than 7, so exchange 1 thousand for 10 hundreds (the thousands digit changes from 6 to 5). Now 11 − 7 = 4. Thousands: 5 − 3 = 2. Answer: **2 457**. Check: 2 457 + 3 748 = 6 205.
c. Ones: 0 is less than 6, so exchange across the zero (the next digit is 0): take 1 from the thousands column (7 becomes 6); each zero on the way becomes 9 and the ones column gains 10. Now 10 − 6 = 4. Tens: 9 − 5 = 4. Hundreds: 9 − 4 = 5. Thousands: 6 − 2 = 4. Answer: **4 544**. Check: 4 544 + 2 456 = 7 000.
d. Ones: 1 is less than 7, so exchange 1 ten for 10 ones (the tens digit changes from 3 to 2). Now 11 − 7 = 4. Tens: 2 is less than 6, so exchange across the zero (the next digit is 0): take 1 from the thousands column (8 becomes 7); each zero on the way becomes 9 and the tens column gains 10. Now 12 − 6 = 6. Hundreds: 9 − 5 = 4. Thousands: 7 − 4 = 3. Answer: **3 464**. Check: 3 464 + 4 567 = 8 031.

Answer to Question 3

a. Round: 3 189 ≈ 3 200 and 4 712 ≈ 4 700. Estimate: 3 200 + 4 700 = 7 900. Exact: Ones: 9 + 2 = 11, write 1 and carry 1. Tens: 8 + 1 + 1 (carried) = 10, write 0 and carry 1. Hundreds: 1 + 7 + 1 (carried) = 9, write 9. Thousands: 3 + 4 = 7, write 7. Answer: **7 901**. The exact answer 7 901 is close to the estimate 7 900, so it is sensible.
b. Round: 7 824 ≈ 7 800 and 2 189 ≈ 2 200. Estimate: 7 800 − 2 200 = 5 600. Exact: Ones: 4 is less than 9, so exchange 1 ten for 10 ones (the tens digit changes from 2 to 1). Now 14 − 9 = 5. Tens: 1 is less than 8, so exchange 1 hundred for 10 tens (the hundreds digit changes from 8 to 7). Now 11 − 8 = 3. Hundreds: 7 − 1 = 6. Thousands: 7 − 2 = 5. Answer: **5 635**. The exact answer 5 635 is close to the estimate 5 600, so it is sensible.
c. Round: 2 478 ≈ 2 500 and 5 346 ≈ 5 300. Estimate: 2 500 + 5 300 = 7 800. Exact: Ones: 8 + 6 = 14, write 4 and carry 1. Tens: 7 + 4 + 1 (carried) = 12, write 2 and carry 1. Hundreds: 4 + 3 + 1 (carried) = 8, write 8. Thousands: 2 + 5 = 7, write 7. Answer: **7 824**. The exact answer 7 824 is close to the estimate 7 800, so it is sensible.

Answer to Question 4

a. Ones: 0 is less than 6, so exchange across the zero (the next digit is 0): take 1 from the thousands column (4 becomes 3); each zero on the way becomes 9 and the ones column gains 10. Now 10 − 6 = 4. Tens: 9 − 3 = 6. Hundreds: 9 − 7 = 2. Thousands: 3 − 1 = 2. Answer: **2 264**. Check: 2 264 + 1 736 = 4 000.
b. Ones: 8 is less than 9, so exchange across the zero (the next digit is 0): take 1 from the thousands column (5 becomes 4); each zero on the way becomes 9 and the ones column gains 10. Now 18 − 9 = 9. Tens: 9 − 4 = 5. Hundreds: 9 − 3 = 6. Thousands: 4 − 2 = 2. Answer: **2 659**. Check: 2 659 + 2 349 = 5 008.
c. Ones: 0 is less than 3, so exchange across the zero (the next digit is 0): take 1 from the hundreds column (1 becomes 0); each zero on the way becomes 9 and the ones column gains 10. Now 10 − 3 = 7. Tens: 9 − 6 = 3. Hundreds: 0 is less than 5, so exchange 1 thousand for 10 hundreds (the thousands digit changes from 9 to 8). Now 10 − 5 = 5. Thousands: 8 − 4 = 4. Answer: **4 537**. Check: 4 537 + 4 563 = 9 100.

Answer to Question 5

a. Check by subtracting: 4 221 − 1 876 = 2 345. It is **correct**.
b. Check by adding: 3 525 + 2 475 = 6 000. It is **correct**.
c. Check by adding: 2 625 + 1 987 = 4 612, not 4 512. It is **wrong**. The right answer is 4 512 − 1 987 = **2 525**.
d. Check by subtracting: 6 002 − 2 094 = 3 908. It is **correct**.

Answer to Question 6

a. Ones: 7 + 9 = 16, write 6 and carry 1. Tens: ■ + 0 + 1 = 7, so the first ■ is **6**. Hundreds: 4 + ■ = 9, so the second ■ is **5**. Check: 3 467 + 2 509 = 5 976.
b. Use the inverse operation: 3 757 + 2 ■ 4 8 must equal ■ 3 0 5. Ones: 7 + 8 = 15, write 5 and carry 1. Tens: 5 + 4 + 1 = 10, write 0 and carry 1. Hundreds: 7 + ■ + 1 must end in 3, so 7 + ■ + 1 = 13 and the ■ in 2 ■ 48 is **5**, with 1 to carry. Thousands: 3 + 2 + 1 = 6, so the top ■ is **6**. Check: 6 305 − 2 548 = 3 757.
c. Ones: 6 + 7 = 13, write 3 and carry 1. Tens: 8 + 5 + 1 = 14, write 4 and carry 1. Hundreds: ■ + 3 + 1 = 8, so the first ■ is **4**. Thousands: 4 + ■ = 8, so the second ■ is **4**. Check: 4 486 + 4 357 = 8 843.

Answer to Question 7

a. 3 468 + 4 125 = **7 593**. Ones: 8 + 5 = 13, write 3 and carry 1. Tens: 6 + 2 + 1 (carried) = 9, write 9. Hundreds: 4 + 1 = 5, write 5. Thousands: 3 + 4 = 7, write 7. Answer: **7 593**.
b. 3 408 − 2 975 = **433**. Ones: 8 − 5 = 3. Tens: 0 is less than 7, so exchange 1 hundred for 10 tens (the hundreds digit changes from 4 to 3). Now 10 − 7 = 3. Hundreds: 3 is less than 9, so exchange 1 thousand for 10 hundreds (the thousands digit changes from 3 to 2). Now 13 − 9 = 4. Thousands: 2 − 2 = 0. Answer: **433**.
c. 3 468 + 2 975 + 1 846 = **8 289**. First 3 468 + 2 975 = 6 443, then 6 443 + 1 846 = 8 289.
d. August total: 4 125 + 3 408 + 2 193 = 9 726. Both months: 8 289 + 9 726 = **18 015**, which is more than 15 000, so yes, it did reach the target, by 3 015 passengers.

Answer to Question 8

a. £1 285 + £1 438 = **£2 723**.
b. £2 050 − £967 = **£1 083**.
c. 1 285 + 967 + 1 438 + 2 050 = **£5 740**. Step by step: 1 285 + 967 = 2 252; 2 252 + 1 438 = 3 690; 3 690 + 2 050 = 5 740.
d. £6 500 − £5 740 = **£760** more.

Answer to Question 9

a. 4 872 + 5 036 = **9 908**.
b. 6 215 − 3 998 = **2 217**.
c. 9 908 + 3 998 = 13 906; 13 906 + 6 215 = **20 121** fans.
d. 7 000 − 5 036 = **1 964** empty seats.

Answer to Question 10

a. 346 + 289 = **635 miles**.
b. 1 042 − 635 = **407 miles**.
c. 1 098 − 1 042 = **56 miles** longer.
d. 1 042 + 1 098 = 2 140, which is more than 2 000, so Dad is **right**.

Answer to Question 11

a. 12 340 → 12 000; 25 870 → 26 000; 9 450 → 9 000; 4 285 → 4 000. Estimate: 12 000 + 26 000 + 9 000 + 4 000 = **51 000**.
b. 12 340 + 25 870 + 9 450 + 4 285 = **51 945**. (12 340 + 25 870 = 38 210; + 9 450 = 47 660; + 4 285 = 51 945.)
c. 25 870 − 4 285 = **21 585** more.
d. Autumn and winter: 9 450 + 4 285 = **13 735**, which is less than 15 000.

Answer to Question 12

a. 3 450 + 2 875 = **6 325 g**.
b. 6 325 g is more than one bag but less than two bags, so **2 bags** are needed (10 000 g). Left over: 10 000 − 6 325 = **3 675 g**.
c. 5 000 − 1 635 = **3 365 g** used.
d. 6 325 g = **6 kg 325 g** (1 000 g = 1 kg).

Answer to Question 13

a. March (3 540) had the most; February (2 876) had the fewest.
b. 3 540 − 2 876 = **664**.
c. 3 214 + 2 876 + 3 540 + 3 107 = **12 737**. (3 214 + 2 876 = 6 090; + 3 540 = 9 630; + 3 107 = 12 737.)
d. 12 737 − 12 500 = **237** above the target.

Answer to Question 14

a. 4 650 + 5 380 = **10 030 m**.
b. 7 000 − 4 650 = **2 350 m**.
c. 4 650 + 5 380 + 6 215 + 7 000 = **23 245 m**. (10 030 + 6 215 = 16 245; + 7 000 = 23 245.)
d. 25 000 − 23 245 = **1 755 m** less.

Answer to Question 15

a. 764 + 1 208 + 655 + 1 042 = 1 972 + 655 + 1 042 = 2 627 + 1 042 = **£3 669**.
b. 2 475 + 386 = **£2 861**.
c. 3 669 − 2 861 = **£808** left.
d. The class raised £3 669, which is £669 **more** than the £3 000 target.
e. 764 + 655 = 1 419. The talent show raised £1 042, which is less than £1 419, so she is **wrong**.

Answer to Question 16

a. 6 478 + 2 735 = **9 213**.
b. 9 213 − 1 904 = **7 309**.
c. 6 478 + 9 213 + 7 309 = 15 691 + 7 309 = **23 000**.
d. Saturday (9 213) was closest. 10 000 − 9 213 = **787 spaces** were free.
e. 9 213 + 7 309 = **16 522**, which is more than 16 000, so the manager is **correct**.

Answer to Question 17

a. 3 584 + 1 297 = **4 881**.
b. 4 881 − 2 463 = **2 418**.
c. 3 584 + 4 881 + 2 418 = 8 465 + 2 418 = **10 883**.
d. 10 883 is less than 12 000, so the council does **not** need the school yet. 12 000 − 10 883 = **1 117** more people are needed.

Answer to Question 18

a. 47 382 + 1 245 = **48 627 miles**.
b. 50 000 − 48 627 = **1 373 miles**.
c. 48 627 + 2 067 = **50 694 miles**.
d. 50 694 − 50 000 = **694 miles** past the service point.
e. The next service is due at 60 000 miles. 50 694 + 3 000 = 53 694, which is less than 60 000, so the van will **not** need a service that week.

Answer to Question 19

a. 1 245 + 873 + 2 178 = **4 296**.
b. 2 018 + 1 450 + 2 417 = **5 885**.
c. 4 296 + 5 885 = **10 181** items.
d. 12 000 − 10 181 = **1 819 fewer** items than last year.
e. Differences: trainers 2 018 − 1 245 = 773; footballs 1 450 − 873 = 577; other 2

417 − 2 178 = 239. The biggest difference is **trainers: 773**.

Answer to Question 20

a. Put the two biggest digits in the thousands column, the next two in the hundreds, then the tens, then the ones: 8 642 + 7 531 = **16 173**. (Other arrangements of the same pairs give the same sum.)
b. Put the two smallest digits in the thousands column, the next two in the hundreds, then the tens, then the ones: 2 468 + 1 357 = **3 825**.
c. The thousands digits are worth the most, so the biggest digits go there for the largest sum, and the smallest digits go there for the smallest sum. Only the pairs matter, not which number gets which digit: the sum is 1000 × (sum of the thousands pair) + 100 × (sum of the hundreds pair) + 10 × (sum of the tens pair) + (sum of the ones pair). For the largest: 1000 × 15 + 100 × 11 + 10 × 7 + 3 = 16 173.