

CHAPTER 2 Multiplication and Division of Whole Numbers

The word “product” is used at the beginning of this chapter and will need explanation.

EXERCISE 2a (p. 12)

Discussion of the properties of odd and even numbers is useful here, e.g. is the product of two even numbers even or odd and why? These properties can be used as simple checks on answers.

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|---------|---------|----------|----------|----------|
| 1. 46 | 11. 141 | 21. 294 | 31. 2859 | 41. 4606 |
| 2. 126 | 12. 324 | 22. 168 | 32. 1632 | 42. 2989 |
| 3. 104 | 13. 126 | 23. 224 | 33. 2628 | 43. 6784 |
| 4. 304 | 14. 588 | 24. 243 | 34. 2184 | 44. 5931 |
| 5. 290 | 15. 324 | 25. 608 | 35. 852 | 45. 5236 |
| 6. 93 | 16. 292 | 26. 2456 | 36. 2565 | 46. 5552 |
| 7. 100 | 17. 162 | 27. 768 | 37. 3174 | 47. 1652 |
| 8. 144 | 18. 132 | 28. 388 | 38. 5142 | 48. 5157 |
| 9. 144 | 19. 536 | 29. 1989 | 39. 3486 | |
| 10. 415 | 20. 657 | 30. 844 | 40. 5211 | |

EXERCISE 2b (p. 13)

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|------------|------------|-------------|-------------|------------|
| 1. 270 | 7. 24 600 | 13. 6630 | 19. 6160 | 25. 35 100 |
| 2. 8200 | 8. 2040 | 14. 88 900 | 20. 70 000 | 26. 42 800 |
| 3. 360 | 9. 7800 | 15. 146 000 | 21. 48 720 | 27. 19 200 |
| 4. 1080 | 10. 2800 | 16. 35 100 | 22. 54 000 | 28. 8800 |
| 5. 256 000 | 11. 29 200 | 17. 9420 | 23. 38 920 | 29. 19 000 |
| 6. 540 | 12. 3480 | 18. 23 600 | 24. 243 000 | 30. 59 920 |

EXERCISE 2c (p. 14)

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|---------|------------|-------------|-------------|---------------|
| 1. 672 | 7. 2782 | 13. 398 793 | 19. 37 814 | 25. 1 438 200 |
| 2. 559 | 8. 4346 | 14. 35 028 | 20. 565 915 | 26. 36 575 |
| 3. 1290 | 9. 7844 | 15. 112 893 | 21. 86 172 | 27. 337 500 |
| 4. 567 | 10. 3204 | 16. 107 520 | 22. 56 648 | 28. 453 750 |
| 5. 1428 | 11. 7712 | 17. 39 934 | 23. 169 422 | 29. 915 264 |
| 6. 1558 | 12. 40 086 | 18. 70 952 | 24. 191 430 | 30. 1 203 000 |

EXERCISE 2d (p. 15)

Checks other than the estimate should be encouraged, e.g. is it even or odd, does it end in zero or five?

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|---------|----------------------|----------------------|----------------------|
| 1. 2400 | 13. 60 000 | 25. 7200, 6612 | 37. 24 000, 22 222 |
| 2. 900 | 14. 300 000 | 26. 40 000, 42 692 | 38. 560 000, 563 997 |
| 3. 3200 | 15. 240 000 | 27. 45 000, 42 987 | 39. 25 000, 23 124 |
| 4. 1500 | 16. 300 000, 244 326 | 28. 50 000, 46 657 | 40. 35 000, 35 972 |
| 5. 9000 | 17. 12 000, 11 136 | 29. 600 000, 579 424 | 41. 24 000, 23 458 |
| 6. 1200 | 18. 12 000, 10 192 | 30. 300 000, 298 717 | 42. 200 000, 231 548 |
| 7. 1200 | 19. 36 000, 34 225 | 31. 5600, 5382 | 43. 480 000, 465 234 |

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|-------------------|---------------------------|---------------------------|---------------------------------|
| 8. 3600 | 20. 16 000, 18 768 | 32. 45 000, 40 091 | 44. 4 900 000, 5 053 014 |
| 9. 3000 | 21. 7200, 7098 | 33. 54 000, 51 888 | 45. 350 000, 346 320 |
| 10. 15 000 | 22. 6000, 8750 | 34. 1000, 846 | |
| 11. 18 000 | 23. 30 000, 32 406 | 35. 6000, 6076 | |
| 12. 24 000 | 24. 30 000, 30 012 | 36. 45 000, 40 281 | |

EXERCISE 2e (p. 16)

If it has not been done earlier, this is an appropriate place to introduce the more able pupils to a more formal setting down of answers.

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|------------------|---------------|------------------|----------------|----------------|
| 1. 8188 | 3. 272 | 5. 22 500 | 7. 2592 | 9. 792 |
| 2. 10 896 | 4. 840 | 6. 1428 | 8. 420 | 10. 672 |

EXERCISE 2f (p. 18)

Not intended for use with a calculator.

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|-----------------|------------------|-------------------|--------------------|--------------------|
| 1. 29 | 10. 13 r4 | 19. 201 r2 | 28. 85 | 37. 1479 r4 |
| 2. 14 | 11. 9 r6 | 20. 124 r1 | 29. 121 r3 | 38. 2193 |
| 3. 6 | 12. 12 r1 | 21. 171 | 30. 140 r2 | 39. 1214 |
| 4. 19 | 13. 13 | 22. 231 | 31. 1167 | 40. 287 |
| 5. 18 | 14. 2 r3 | 23. 103 | 32. 440 r3 | 41. 198 r6 |
| 6. 48 r1 | 15. 13 | 24. 71 r3 | 33. 2414 r1 | 42. 183 |
| 7. 14 r3 | 16. 27 | 25. 24 | 34. 351 r3 | 43. 354 r3 |
| 8. 20 r3 | 17. 213 | 26. 32 r6 | 35. 428 | 44. 1727 r2 |
| 9. 23 | 18. 274 | 27. 81 r3 | 36. 1067 r3 | 45. 1501 |

EXERCISE 2g (p. 19)

Not intended for use with a calculator.

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|-----------------|------------------|------------------|-------------------|-------------------|
| 1. 25 r6 | 4. 27 r83 | 7. 18 r6 | 9. 9 r426 | 11. 30 r77 |
| 2. 8 r7 | 5. 4 r910 | 8. 278 r1 | 10. 85 r12 | 12. 5 r704 |
| 3. 1 r96 | 6. 5 r7 | | | |

EXERCISE 2h (p. 19)

Not intended for use with a calculator.

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|-------------------|--------------------|--------------------|--------------------|--------------------|
| 1. 12 r14 | 13. 215 r9 | 25. 304 r19 | 37. 2 r33 | 49. 7 r87 |
| 2. 52 r9 | 14. 348 r7 | 26. 573 r7 | 38. 107 r17 | 50. 26 r15 |
| 3. 18 r1 | 15. 246 r28 | 27. 96 r28 | 39. 111 r13 | 51. 24 r65 |
| 4. 34 r12 | 16. 456 r1 | 28. 64 r8 | 40. 190 r20 | 52. 32 r200 |
| 5. 20 r14 | 17. 127 r22 | 29. 202 r22 | 41. 25 r0 | 53. 12 r6 |
| 6. 8 r11 | 18. 86 r28 | 30. 89 r24 | 42. 111 r5 | 54. 56 r91 |
| 7. 35 r0 | 19. 75 r0 | 31. 200 r13 | 43. 90 r30 | 55. 25 r75 |
| 8. 16 r13 | 20. 120 r21 | 32. 65 r14 | 44. 200 r0 | 56. 20 r110 |
| 9. 16 r21 | 21. 221 r0 | 33. 83 r29 | 45. 11 r6 | 57. 6 r142 |
| 10. 21 r4 | 22. 135 r24 | 34. 146 r34 | 46. 20 r10 | 58. 74 r44 |
| 11. 28 r13 | 23. 236 r0 | 35. 77 r9 | 47. 20 r4 | 59. 27 r109 |
| 12. 22 r20 | 24. 217 r15 | 36. 469 r1 | 48. 42 r38 | 60. 22 r152 |

EXERCISE 2i (p. 21)

Not intended for use with a calculator. If calculators are used to check answers, tuition on their use for mixed operations will be needed and will vary with the type of calculator used. A simple four-function calculator does not usually give priority to \times and \div but a scientific calculator usually does and if pupils have a calculator with this facility it should be used.

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|-------|--------|--------|--------|--------|
| 1. 18 | 9. 7 | 17. 3 | 25. 6 | 33. 12 |
| 2. 0 | 10. 21 | 18. 13 | 26. 8 | 34. 13 |
| 3. 12 | 11. 9 | 19. 26 | 27. 10 | 35. 32 |
| 4. 19 | 12. 17 | 20. 6 | 28. 8 | 36. 9 |
| 5. 0 | 13. 2 | 21. 8 | 29. 5 | 37. 16 |
| 6. 5 | 14. 5 | 22. 22 | 30. 9 | 38. 14 |
| 7. 22 | 15. 1 | 23. 13 | 31. 21 | 39. 14 |
| 8. 7 | 16. 10 | 24. 17 | 32. 14 | 40. 30 |

EXERCISE 2j (p. 22)

Not for use with a calculator.

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|-------|--------|--------|--------|--------|
| 1. 2 | 7. 49 | 13. 17 | 19. 4 | 25. 10 |
| 2. 56 | 8. 2 | 14. 2 | 20. 36 | 26. 1 |
| 3. 9 | 9. 45 | 15. 11 | 21. 45 | 27. 4 |
| 4. 14 | 10. 2 | 16. 7 | 22. 6 | 28. 25 |
| 5. 15 | 11. 17 | 17. 30 | 23. 14 | 29. 1 |
| 6. 8 | 12. 3 | 18. 1 | 24. 0 | 30. 18 |

EXERCISE 2k (p. 23)

Intended for the above average; with the others it should be approached with caution or omitted.

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| 1. 6 and 2p over | 16. 9p, 18p, 33p |
| 2. 68p | 17. 412p (or £4.12) |
| 3. 14 | 18. £21 |
| 4. 18 | 19. 225 275 |
| 5. 8p | 20. 54 (one not full) |
| 6. 15p | 21. 67 |
| 7. 150 miles | 22. 1831 or 1832 depending on her birth date |
| 8. 74 | 23. 26 |
| 9. £1.45 | 24. 124 |
| 10. 16 and 2kg over | 25. 600m |
| 11. 76 | 26. 12min |
| 12. 40p | 27. 15 |
| 13. 20p | 28. 15p |
| 14. 90 | 29. 34 |
| 15. 840cm | 30. 1h; 25min |

EXERCISE 2l (p. 26)

Gives interesting variations on straightforward arithmetic.

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|----|--|----|----|---|---|---|---|---|---|---|----|--|---|---|---|---|---|---|---|---|---|----|---|---|----|---|----|----|---|----|---|---|---|----|---|
| 1. | <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>8</td><td>1</td><td>6</td></tr><tr><td>3</td><td>5</td><td>7</td></tr><tr><td>4</td><td>9</td><td>2</td></tr></table> | 8 | 1 | 6 | 3 | 5 | 7 | 4 | 9 | 2 | 2. | <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>4</td><td>9</td><td>2</td></tr><tr><td>3</td><td>5</td><td>7</td></tr><tr><td>8</td><td>1</td><td>6</td></tr></table> | 4 | 9 | 2 | 3 | 5 | 7 | 8 | 1 | 6 | 3. | <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>2</td><td>14</td><td>7</td><td>11</td></tr><tr><td>15</td><td>3</td><td>10</td><td>6</td></tr><tr><td>9</td><td>5</td><td>16</td><td>4</td></tr></table> | 2 | 14 | 7 | 11 | 15 | 3 | 10 | 6 | 9 | 5 | 16 | 4 |
| 8 | 1 | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 5 | 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 9 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 9 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 5 | 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | 1 | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | 14 | 7 | 11 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | 3 | 10 | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | 5 | 16 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

8	12	1	13
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5. 9, 11 10. 15, 18 14. 10 000, 100 000
 6. 13, 16 11. 4, 2 15. 45, 36
 7. 4, 2 12. 81, 243 16. 19, 23
 8. 17, 21 13. 36, 49 17. 37, 50
 9. 32, 64

18. $1 + 3 + 5 + 7 + 9 = 25 = 5 \times 5$
 $1 + 3 + 5 + 7 + 9 + 11 = 36 = 6 \times 6$
 $1 + 3 + 5 + 7 + 9 + 11 + 13 = 49 = 7 \times 7$
 a) 64 b) 400

19. $2 + 4 + 6 + 8 + 10 = 30 = 5 \times 6$
 $2 + 4 + 6 + 8 + 10 + 12 = 42 = 6 \times 7$
 $2 + 4 + 6 + 8 + 10 + 12 + 14 = 56 = 7 \times 8$
 12

20.
$$\begin{array}{cccccccc} & & 1 & & 5 & & 10 & & 10 & & 5 & & 1 \\ & & & 1 & & 6 & & 15 & & 20 & & 15 & & 6 & & 1 \\ & & & & 1 & & 7 & & 21 & & 35 & & 35 & & 21 & & 7 & & 1 \end{array}$$

21. 35

24. a) 1, 4, 9, 16 b) 25 c) 36, 49 d) 7, 9, these differences go up by 2 each time

25. a) 1, 3, 6, 10, 15, 21, 28 b) 2, 3, 4, 5, 6, 7 c) 1, 1, 1, 1, 1

26. 3, 8, 13, 18, ..., 38, ...

27. 1, 2, 4, 8, ..., 32, ...

28. a) (i) 20, 24, 28 (ii) 4 (iii) 0
 b) (i) 24, 29, 34 (ii) 5 (iii) 0
 c) (i) 32, 64, 128 (ii) 2, 4, 8, 16, 32, 64 (iii) 2, 4, 8, 16, 32
 d) (i) 162, 486, 1458 (ii) 4, 12, 36, 108, 324, 972 (iii) 8, 24, 72, 216, 648

in (ii) and (iii), multiply by 3 each time

29. 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, ...

30. 1, 2, 2, 4, 8, 32, 256, 8192, ...

31. 15 and 33. ...add 6 each time

32. 1 and $\frac{1}{4}$divide by 2 each time

33. 3 and 9. ...multiply by 3 each time

34. a) 9 b) 15

35. a) 15 b) 36

EXERCISE 2m (p. 30)

1. 1005 3. 684 5. 6608 7. 242 9. 6 (10p over)
 2. 17 4. 28 6. 1018 8. 7 10. 46p

EXERCISE 2n (p. 30)

1. 870 3. 672 5. 29 7. 50 9. 7 (3 left)
 2. 54 4. 9 r7 6. 118 8. 37 10. 5

EXERCISE 2p (p. 31)

1. 2304 3. 413 5. 277 r8 7. 260 9. 35, 45

2. 263 4. 3392 6. 393 r3 8. 19 r133 10. 33

EXERCISE 2q (p. 31)

1. 3133 3. 8200 5. 278 r1 7. 3 9. 34p
2. 169 4. 4544 6. 713 8. 132