# Algebra & Sequences: Hard Practice Paper 8 Answers

| Q# | Answer | Explanation |
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| 1 | D | Work out terms until one passes 40. The 8th term is 64 − 24 = 40, which is not greater than 40, and the 9th term is 81 − 27 = 54, which is. So 54 is the first term above 40. |
| 2 | D | Multiply both sides by 4 to undo the division, which gives x − 3 = 20. Then add 3 to both sides, so x = 23. |
| 3 | B | Both orders contain three teas, so the difference between them is the price of one cake: 9.50 − 7.00 = 2.50, so a cake costs £2.50. Taking that off the second order leaves 7.00 − 2.50 = 4.50 for the three teas, so one tea costs 4.50 ÷ 3 = 1.50, or £1.50. |
| 4 | D | Square first, before multiplying by 2. Since −3 multiplied by itself is 9, the first part is 2 × 9 = 18. Subtracting m means subtracting −3, which is the same as adding 3, so the value is 18 + 3 = 21. |
| 5 | E | 3(k + 2) is 3 multiplied by a whole number, so it always lands in the 3 times table. The others do not: 3k + 1 is always one more than a multiple of 3, and with k = 1 the last three give 4, 1 and 5, none of which divides by 3. |
| 6 | D | The terms match when 5n + 2 and 3n + 20 are equal. Taking 3n from both sides leaves 2n + 2 equal to 20, so 2n = 18 and n = 9. Checking the 9th terms: 45 + 2 = 47 and 27 + 20 = 47. |
| 7 | C | Call the 2nd term b. The 3rd term is then 2 + b, and the 4th term is the 2nd added to the 3rd, which comes to 2b + 2. That equals 20, so 2b = 18 and b = 9. The sequence is 2, 9, 11, 20. |
| 8 | A | Expand each bracket: the first gives 12y − 6 and the second gives 10y − 14. Subtracting the whole of the second bracket flips both of its signs, leaving 12y − 6 − 10y + 14. The y terms give 2y, and −6 + 14 gives 8, so the answer is 2y + 8. |
| 9 | D | The angles of a triangle add up to 180°, and here they add to 6x, so 6x = 180 and x = 30. The largest angle is 3x, which is 3 × 30 = 90°. |

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| 10 | C | The number of tiles rises by 5 each time, so the rule begins with 5n. The first pattern needs 5 + 3 = 8, so the rule is 5n + 3. For pattern 20, 5 × 20 = 100, and then 100 + 3 = 103. |
| 11 | C | Add the two facts together and the y terms cancel out, leaving two lots of x equal to 12 + 4 = 16, so x = 8. Then y is 12 − 8 = 4, and their product is 8 × 4 = 32. |
| 12 | C | Call Anna's age now a. In 3 years she will be a + 3, and 4 years ago she was a − 4, so twice that is 2a − 8. Setting the two equal and taking a from each side leaves 3 equal to a − 8, so a = 11. Checking: in 3 years she will be 14, and 4 years ago she was 7, and 14 is twice 7. |
| 13 | B | A number in both sequences has to be a multiple of 4 and a multiple of 6, which means it must be in the 12 times table. Only 24 is, since 24 ÷ 4 = 6 and 24 ÷ 6 = 4. Of the rest, 40 misses the 6s and 18, 30 and 54 miss the 4s. |
| 14 | A | From the 4th term to the 9th there are 5 steps, and the rise is 53 − 23 = 30, so each step is 30 ÷ 5 = 6. The rule therefore starts with 6n, which would make the 4th term 24. The real 4th term is 1 less than that, so the rule is 6n − 1. |
| 15 | C | Set the 3 extra pencils aside first: they cost 3 × 30 = 90 pence, leaving 390 − 90 = 300 pence. What is left buys equal numbers of pens and pencils, and one of each costs 45 + 30 = 75 pence, so there are 300 ÷ 75 = 4 pens. |

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