Algebra & Sequences: Hard Practice Paper 6 Answers

Q#	Answer	Explanation
1	A	The gaps are 3, then 5, then 7, so the sequence does not go up by the same amount and the rule cannot be a simple multiple of n. Comparing it with the square numbers 1, 4, 9, 16 shows every term is 2 more, so the rule is $n^2 + 2$.
2	B	Undo the division first by multiplying both sides by 2, which gives $3x + 1 = 16$. Take 1 from both sides to get $3x = 15$, so $x = 5$.
3	D	Both orders contain three drinks, so the only difference between them is one extra cake. The difference in price is 8.40 − 5.70 = 2.70, so a cake costs £2.70.
4	C	Work out the bracket first: −5 + 2 gives −3. Squaring means multiplying that by itself, and two negatives make a positive, so the value is 9.
5	E	The sequence goes up in 7s, so adding 2 to any term must give a multiple of 7. Four of them pass the test: 61 + 2 = 63, 75 + 2 = 77, 89 + 2 = 91 and 96 + 2 = 98 are all multiples of 7. But 100 + 2 = 102 is not, so 100 cannot be a term.
6	C	Take off the fixed charge first: 126 − 30 = 96 pounds was paid for the hours themselves. Each hour costs £12, so 96 ÷ 12 = 8 hours.
7	C	Work backwards, since the 3rd and 4th terms add to make the 5th: the 3rd term is 28 − 17 = 11. In the same way the 2nd and 3rd terms add to make the 4th, so the 2nd term is 17 − 11 = 6. The sequence is 5, 6, 11, 17, 28.
8	A	Expand each bracket: the first gives $10a - 15$ and the second gives $6a - 14$. Subtracting the whole of the second bracket changes both of its signs, leaving $10a - 15 - 6a + 14$. The a terms give $4a$, and $-15 + 14$ gives -1, so the answer is $4a - 1$.
9	C	One length and one width together come to $3x + 1$, and the perimeter is double that, so $6x + 2 = 32$. Taking 2 from both sides gives $6x = 30$, so $x = 5$. The rectangle is therefore 11 cm long and 5 cm wide, and 11 × 5 = 55, so the area is 55 cm².

10	D	Two sequences are woven together here. The terms in the odd positions are 2, 4, 6, 8, going up in 2s, and the terms in the even positions are 5, 10, 15, going up in 5s. The next term is an even-position one, so it is 15 + 5 = 20.
11	C	Each output is 1 more than three times the input, since 3 × 2 + 1 = 7 and 3 × 5 + 1 = 16. To go backwards, undo the adding and then the multiplying: 46 − 1 = 45, and 45 ÷ 3 = 15.
12	A	2(n + 3) is 2 multiplied by a whole number, and anything doubled is even. The others all depend on n: n + 2, 3n and n^2 are odd whenever n is odd, and 2n + 1 is always odd rather than even.
13	C	Put n = 12 into the rule. The bracket gives 13, so the top of the fraction is 12 × 13 = 156, and then 156 ÷ 2 = 78.
14	B	Apply the rule each time. From 40 comes 20 + 4 = 24, then from 24 comes 12 + 4 = 16, then from 16 comes 8 + 4 = 12. So the terms are 40, 24, 16, 12.
15	B	Call Ben's money x pounds, so Sara has x + 8 and Tom has 2x. Altogether that is 4x + 8 pounds, which must equal 48. Taking the 8 away gives 4x = 48 − 8 = 40, so x = 10 and Ben has £10.