Foundation GCSE: Finding a Position-to-Term Rule

Name: _____ Class: _____

Instructions: Answer all questions. Questions are ordered from easiest (1) to hardest (20). Working out should be shown where appropriate.

1. Find the nth term rule for the sequence: $5, 7, 9, 11, \ldots$
2. Find the nth term rule for the sequence: $3, 6, 9, 12, \ldots$
3. Find the nth term formula for: $4, 7, 10, 13, \ldots$
4. Find the nth term rule for: $6, 11, 16, 21, \ldots$
5. Find the nth term for the decreasing sequence: $10, 8, 6, 4, \ldots$
6. Find the nth term rule for: $2, 5, 8, 11, \ldots$
7. Find the nth term for the sequence: $7, 11, 15, 19, \ldots$
8. Find the nth term formula for: $1, 3, 5, 7, \ldots$
9. Find the nth term rule for: $-3, 1, 5, 9, \ldots$
10. Find the nth term rule for the sequence: $20, 17, 14, 11, \ldots$
11. Find the nth term for the sequence: $0.5, 1.0, 1.5, 2.0, \ldots$
12. A sequence has 1st term 8 and 2nd term 13. Find its nth term rule.
13. Find the nth term for the sequence: $10, 17, 24, 31, \ldots$
14. Find the nth term for the fractional sequence: $\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \ldots$
15. Find the nth term rule for the quadratic sequence: $3, 6, 11, 18, \ldots$
16. Find the nth term rule for the quadratic sequence: $4, 9, 16, 25, \ldots$
17. The 3rd term of a linear sequence is 11 and the 6th term is 23. Find the nth term rule.
18. Find the nth term rule for the quadratic sequence: $2, 5, 10, 17, \ldots$
19. A linear sequence has nth term $an + b$. If the 5th term is 22 and 10th term is 42, find a and b.
20. Find the nth term rule for the quadratic sequence: $5, 10, 17, 26, \ldots$

Answers & Worked Solutions

1. $2n + 3$ – Difference is 2, adjust by $+3$.
2. $3n$ – Difference is 3, 1st term is 3.
3. $3n + 1$ – Difference is 3, plus 1.
4. $5n + 1$ – Difference is 5, 0th term is 1.
5. $-2n + 12$ – Difference is -2, work backwards: $10 - (-2) = 12$.
6. $3n - 1$ – Difference is 3, $3(1) - 1 = 2$.
7. $4n + 3$ – Difference is 4, 0th term is $+3$.
8. $2n - 1$ – Difference is 2, $2(1) - 1 = 1$.
9. $4n - 7$ – Difference is 4, $4(1) - 7 = -3$.
10. $-3n + 23$ – Difference is -3, 0th term is 23.
11. $0.5n$ (or $\frac{1}{2}n$) – Difference is 0.5.
12. $5n + 3$ – Difference is 5, $8 - 5(1) = 3$.
13. $7n + 3$ – Difference is 7, $10 - 7(1) = 3$.
14. $\frac{n}{n+1}$ – Numerator n, denominator $n + 1$.
15. $n^2 + 2$ – 2nd diff is 2 $\implies$ n^2, compare to get $+2$.
16. $(n + 1)^2$ (or $n^2 + 2n + 1$) – Square numbers starting from 2^2.
17. $4n-1$ – Step is $(23-11)/3 = 4$, then $11-4(3) = -1$.
18. $n^2 + 1$ – 2nd diff is 2 $\implies$ n^2, compare to get $+1$.
19. $4n+2$ – $a = 20/5 = 4$, $22 = 4(5)+b$ $\implies$ $b = 2$.
20. $n^2 + 4$ – 2nd diff is 2 $\implies$ n^2, compare to get $+4$.