Year 7 · Algebra: Solving Equations and Spotting Patterns

Name: _____ Date: _____

Kia ora! This sheet helps you tidy up algebra expressions, solve equations step by step, and find rules in patterns. Take your time and always check your answers by substituting back in.

Warm-up

1. Simplify: $4a + a + 2a$

2. Solve for t: $t + 7 = 12$

3. If $w = 4$, find the value of $w + 12$.

4. True or false? $3 \times 5 > 2 \times 7$

Practice

5. Simplify: $6b - 2b + 3b$

6. Solve for s: $5s + 3 = 18$

7. Aria buys 3 identical drink bottles at the Avondale market. She pays with a $20 note and gets $5 change. Let c be the cost of one bottle. Write an equation and find c.

8. The area of a rectangle is $A = l \times w$. A netball court section has area $A = 48$ m² and length $l = 8$ m. Rearrange the formula to make w the subject, then find w.

9. Tane is stacking chairs for a school event. He starts with 4 chairs and adds 3 chairs each minute. The number of chairs t after n minutes is $t = 3 \times n + 4$. How many chairs are there after 6 minutes?

10. Plot these three points on a coordinate plane and state which quadrant each is in: A(3, 2), B(−4, 1), C(−2, −3).

Challenge

11. A pattern of matchstick triangles grows like this: 1 triangle uses 3 matches, 2 triangles use 5 matches, 3 triangles use 7 matches. Find a rule in the form $t = a \times n + d$ for the number of matches t for n triangles, then work out how many matches are needed for 20 triangles.

12. Solve for x: $4x - 5 = 2x + 7$. Then check your answer by substituting into both sides.