Year 9 · Algebra: Lines, Rules & Solving Equations

Name: _____ Date: _____

Kia ora! This sheet helps you practise tidying up expressions, solving equations, and working with straight-line rules like y = mx + c. Show your steps, they matter as much as the answer.

Warm-up

1. Simplify: 5a + 3b − 2a + 7b

2. Expand: 4(x + 3)

3. Find the value of 2x − 5 when x = 3.

4. Solve: x + 7 = 12

Practice

5. Expand and simplify: 3(2x + 4) − 5

6. Factorise fully: 12y + 18

7. Solve: ½x + 3 = 7

8. A taxi from Avondale charges a $4 fixed fee plus $2.50 for each kilometre travelled. Write a rule for the total cost C (in dollars) for k kilometres, then find the cost of a 6 km trip.

9. Mere builds patterns with matchsticks. Pattern 1 uses 4 matches, Pattern 2 uses 7, and Pattern 3 uses 10. Describe the rule in words, write it using n for the pattern number, and find how many matches Pattern 10 needs.

10. The perimeter of a rectangle is P = 2l + 2w. Rearrange the formula to make w the subject, then find w when P = 30 cm and l = 8 cm.

Challenge

11. Solve the inequality 5 − 2x ≤ 11. Show clearly what happens when you divide by a negative number.

12. A straight line gives this table of values, x: −2, −1, 0, 1, 2 and y: 7, 5, 3, 1, −1. Find the gradient m and y-intercept c, write the equation, state whether the line slopes up or down, and predict y when x = 5.