

# Algebra investigation – patterns and rules

MODULE 10 · ALGEBRA – PATTERNS, RULES AND NUMBER SENTENCES

ALGEBRA

## HOW TO ANSWER TODAY

- **Solve for x.** Do the OPPOSITE operation to both sides. + becomes –; × becomes ÷.  
 $x + 7 = 15 \rightarrow x = 15 - 7 = 8$  ·  $3x = 21 \rightarrow x = 21 \div 3 = 7$
- **Find the rule.** Look at how each input changes to its output. Try × first, then + or –.  
 $3 \rightarrow 6, 5 \rightarrow 10, 7 \rightarrow 14 \rightarrow$  rule is  $\times 2$
- **Property names.** Order swaps ( $a + b = b + a$ ) → commutative. Brackets move ( $((a+b)+c = a+(b+c))$ ) → associative. One spreads over two ( $a(b+c) = ab+ac$ ) → distributive.  
 $5 + 3 = 3 + 5 \rightarrow$  commutative ·  $2 \times (4 + 5) = 2 \times 4 + 2 \times 5 \rightarrow$  distributive

## STRETCH PROBLEMS

1



Find x so the scale balances.

On the school tour to the Cliffs of Moher, Aoife spends **10 euro** from her wallet on a souvenir. She now has **9 euro** left. Solve for x, where  $x - 10 = 9$ , to find how much money she had at the start.

2



Mr Ó Briain pins a number-rule chart on the 4th class noticeboard with three input-output pairs: **8 → 32**, **3 → 17**, and **7 → 29**. What is the rule that turns each input into its output?

3

Mr Ó Briain writes an equation on the board while 3rd class decorate the room for World Book Day:  **$9 \times (9 + 14) = 9 \times 9 + 9 \times 14$** . Which property of operations does this equation show: commutative, associative, or distributive?

4



Find x so the scale balances.

Cian and his sister save the same amount of pocket money each week for **7** weeks. Together they have saved **€70** in total, so  $7x = 70$ , where x is the amount saved each week. What is the value of x?

5

Cian saves **€19** in January, **€25** in February, **€31** in March and **€37** in April from his pocket money. He adds the same amount each month. How much will he have saved by the end of May?

What comes next in the sequence: 19, 25, 31, 37, \_\_\_\_?