Properties of operations and the distributive law

MODULE 10 · ALGEBRA — PATTERNS, EXPRESSIONS AND EQUATIONS ALGEBRA

Operations obey **properties**: order doesn't matter for + and × (commutative), and the **distributive law** splits a product over a sum.

→ 6 × 23 = 6 × 20 + 6 × 3 = 120 + 18 = **138**.

	× 20	× 3
6	120	18

Total: 120 + 18 =

HOW TO ANSWER TODAY

- **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 → commutative · 2 × (4 + 5) = 2 × 4 + 2 × 5 → distributive

WARM-UP

1. At a sleepover, Aoife sets out the biscuits in 5 rows of 3 on one tray, and Cian sets out his in 3 rows of 5 on another tray. They notice that 5 × 3 = 3 × 5 gives the same total. Which property of operations does this equation show: commutative, associative, or distributive?

   > Which property of operations does this equation show: $5 \times 3 = 3 \times 5$? (Choose: commutative, associative, or distributive.)

2. Tadhg is counting pencils in the classroom store. He works out 23 + 21 and his friend Aoife works out 21 + 23, and they both get the same total. Which property of operations does the equation 23 + 21 = 21 + 23 show: commutative, associative, or distributive?

   > Which property of operations does this equation show: $23 + 21 = 21 + 23$? (Choose: commutative, associative, or distributive.)

PRACTICE

1. On Monday morning, Master Ó Briain is checking the roll in 5th class. He notices that the equation (9 × 9) × 4 = 9 × (9 × 4) is written on the whiteboard from Friday's maths lesson. Which property of operations does this equation show: commutative, associative, or distributive?

2. On the 5th class nature walk through the local park, Oisín spots groups of leaves on the ground. He writes (7 × 4) × 4 = 7 × (4 × 4) in his nature copy to show two ways of counting the leaves. Which property of operations does his equation show: commutative, associative, or distributive?

   > Which property of operations does this equation show: $(7 \times 4) \times 4 = 7 \times (4 \times 4)$? (Choose: commutative, associative, or distributive.)

CHALLENGE

1. At granny's house for Sunday dinner, Saoirse explains to her younger cousin how 7 × (4 + 10) = 7 × 4 + 7 × 10 must be true without working out either side. Which property of operations is she showing: commutative, associative, or distributive?

   > Which property of operations does this equation show: $7 \times (4 + 10) = 7 \times 4 + 7 \times 10$? (Choose: commutative, associative, or distributive.)

2. Saoirse watches the classroom bird-feeder for 9 days. Each day she counts 9 finches and 14 sparrows visiting the feeder. To work out the total visits, she writes 9 × (9 + 14) = 9 × 9 + 9 × 14 in her maths copy. Which property of operations does this equation show: commutative, associative, or distributive?