Have we found every factor pair?

Years 4–6; multiplication and equal rows

1. Arrange 18 counters into all different complete rectangular arrays. Write each factor pair; rotations count only once.

2. List every positive factor of 18 in increasing order. Explain how your arrays help.

3. Find all factor pairs of 16. What is special about one array?

Try it. Explain it. Check it.

4. A pupil lists 1×24, 2×12 and 4×6 as all the factor pairs of 24. Find the missing pair.

5. Compare 16, 17 and 18. Which is prime? Explain using factors, not its size.

6. Is 1 prime? Explain using the definition: a whole number greater than 1 with exactly two positive factors.

Answers and teaching notes

1. 1×18, 2×9, 3×6. Rotations repeat these pairs.

2. 1, 2, 3, 6, 9, 18. Each pair supplies factors.

3. 1×16, 2×8, 4×4. The 4×4 array is square. Factors: 1,2,4,8,16.

4. 3×8. All pairs: 1×24, 2×12, 3×8, 4×6.

5. 17 is prime: its only positive factors are 1 and 17. Both 16 and 18 have additional factors.

6. No. It is not greater than 1 and has only one positive factor.

What to ask next

Offer 20 or 25 counters next. Ask for a complete list and a reason it is complete; avoid treating a guessed list as proof.

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