

# 5.2.1 Event Sets

Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

KEY WORDS intersection

<!-- Session 2 native-skill companion -->

## Objective

Practise event sets within the labelled native lessons. Public original tasks; locally authored answer guidance.

## 1 Key knowledge and worked examples

### ■ Venn diagrams, unions and two-way counts · Foundation

Place the overlap in a Venn diagram first, then fill the only-regions and neither-region. Union means at least one named set; intersection means both; complement means outside a named set in the stated universal group. Two-way tables classify every observation by one category from each of two variables. Check row, column and grand totals.

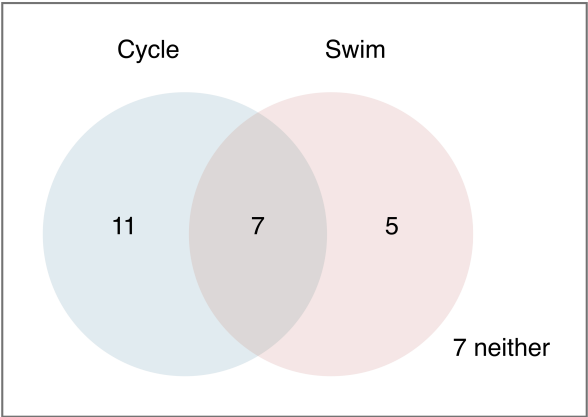
$$n(A \cup B) = n(A) + n(B) - n(A \cap B)$$

In a class of 30, 18 cycle, 12 swim and 7 do both. Cycling only is 11 and swimming only 5; at least one is 11+7+5=23, leaving 7 neither. A random student has probability 7/30 of both and 23/30 of at least one. The two-way table has cycle-and-swim 7, cycle-not-swim 11, not-cycle-swim 5 and neither 7. The cycle row totals 18, swim column totals 12 and grand total 30. The outcomes both, cycling only, swimming only and neither are mutually exclusive and exhaustive, so their probabilities sum to 1. A frequency tree starts at 30, branches to cycle 18 and not-cycle 12, then to swim/not-swim counts 7/11 and 5/7. Each pair of terminal counts sums back to its parent.

Do not add the overlap twice. Neither is outside both circles, not just outside their overlap. A universal group must be stated before taking a complement.

AQA P4/P6 uses exhaustive events, systematic sets and Venn/table representations. Translate the words both, either/at least one, only and neither into the correct counted regions.

30 students: overlap first, then only and neither



Original native-lesson illustration; labels belong to its worked example.

## 2 Practice

2.1 (Foundation) Find cycling only with 18 cycling and 7 doing both.

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\_\_\_\_\_

\_\_\_\_\_

2.2 (Foundation) Find at least one sport for totals 18,12 and overlap 7.

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\_\_\_\_\_

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2.3 (Foundation) Find neither in the class of 30.

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### 3 Exam-style questions

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**3.1** Decide whether this claim is true. Justify with a concrete calculation or counterexample: The union count is always the sum of the two set counts without adjustment.

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## Solutions

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**2.1** Subtract the overlap:  $18-7$ .

**2.2**  $18+12-7=23$ .

**2.3**  $30-23=7$ .

**3.1** False. If 18 cycle, 12 swim and 7 do both, the union has  $18+12-7=23$ . Adding without subtracting counts the overlap twice.

Local review guidance: show the chosen method; give the checked result; explain the condition or failed shortcut. This is authored classroom guidance.