Solutions

Award method and answer marks as indicated; accept equivalent correct methods.

2.1

- Keep elements in both lists: $\{2, 4\}$.

2.2

- Combine without repeats: $\{1, 2, 3, 4, 6, 8\}$.

2.3

- Remove 2, 4, 6 and 8 from the universal set: $\{1, 3, 5, 7\}$.

2.4

- Include the lower boundary but exclude 2: $\{-2, -1, 0, 1\}$.

3.1

(a)

- $n(\text{cycle only}) = 16 - 5 = \mathbf{11}$.

(b)

- $n(\text{union}) = 16 + 12 - 5 = \mathbf{23}$; subtract the overlap once.

(c)

- $n(\text{neither}) = 28 - 23 = \mathbf{5}$.

3.2

(a)

- Only swim: $s = 24 - 10 = \mathbf{14}$.
- Only run: $r = 18 - 10 = \mathbf{8}$.
- Union $u = 24 + 18 - 10 = 32$, so neither $n = 40 - 32 = \mathbf{8}$.

(b)

- The ten in both activities are counted twice.
- Use $n(S \cup R) = n(S) + n(R) - n(S \cap R)$.
- $u = 24 + 18 - 10 = \mathbf{32}$ pupils.

3.3

(a)

- $A = \{2, 4, 6, 8, 10, 12\}$ and $B = \{3, 6, 9, 12\}$, so $A \cap B = \{\mathbf{6},\ \mathbf{12}\}$.

(b)

- $A \cup B = \{2, 3, 4, 6, 8, 9, 10, 12\}$.
- $n(A \cup B) = \mathbf{8}$.

(c)

- Multiples of 3 that are not even: $A' \cap B = \{\mathbf{3},\ \mathbf{9}\}$.

3.4

- People who like at least one drink: $50 - 8 = 42$.
- $30 + 25 = 55$ counts the people who like both twice.
- Both $= 55 - 42 = \mathbf{13}$.