Solutions

2.1

- $\binom{9}{3} = 84$ ✓.

2.2

- $5! = 120$ ✓.

2.3

- $12 + 9 - 4 = 17$ ✓.

3.1

- Without restriction: each of 4 slots picks from 36 – 36^4 ✓.
- All-letter: 26^4; at least one digit: subtract – complement ✓.
- $36^4 = 1679616$; $26^4 = 456976$; difference 1222640 ✓.
- No repetition: $36 \cdot 35 \cdot 34 \cdot 33 = 1413720$; all-letter no repetition $26 \cdot 25 \cdot 24 \cdot 23 = 358800$; answer 1054920? – recompute: $1413720 - 358800 = 1054920$ ✓.

3.2

- At least one: $30 + 25 + 20 - 12 - 9 - 7 + 4 = 51$ ✓.
- Exactly two: each pair count minus the triple, summed: $(12-4)+(9-4)+(7-4) = 16$ ✓.
- Exactly one: $51 - 16 - 4 = 31$; none: 9 ✓.
- Partition check: $31 + 16 + 4 + 9 = 60$ ✓.

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