Solutions

2.1

- 2 (n+1) : 2 (n) ✓.

2.2

- 47,XX,+21 ✓.

2.3

- The X carries essential genes; no X = non-viable.

3.1

- Meiosis I (~95 % of cases).
- Recurrence ≈ 1 % (above population for a young mother) - a small predisposition to nondisjunction persists.
- A Robertsonian translocation 21;14 would raise recurrence to 10–15 % (carrier parent) - karyotype the parents if family history or young maternal age.

3.2

- The nondisjunction occurred in an early mitotic division of the embryo.
- Milder: some tissue is euploid (46).
- If a parent has germline mosaicism, apparently de-novo cases can recur - counselling acknowledges it.