

Solutions

Each answer shows the steps, then the **result**.

2.1 any two:

- **cheaper**
- **safer**, e.g. no one can be hurt
- **faster**: years can be simulated in seconds
- can be **repeated** many times with different settings

2.2

- it **leaves out** details of the real situation and keeps only those that matter

2.3

- about **0.5**
- run **more** flips

2.4 any one:

- a **simplifying assumption** leaves out something that matters
- the data or probabilities used are not accurate

3.1 B

- the real experiment is dangerous and expensive; simulations are estimates, not exact

3.2 B

- real customers vary; ignoring slow ones makes long waits look rarer

3.3 A

- more trials make the average closer to the true value

3.4

(a)

- expected number having young: $20 \times \frac{1}{4} = 5$
- each adds 2: $5 \times 2 = \mathbf{10}$ born

(b) any two:

- no rabbits **die**
- every rabbit can have young, whatever its **age** or sex
- the chance of having young is the **same** every year; there is no limit on **food** or space
- every litter is exactly 2 young

(c)

- the code uses **RANDOM**, so the number born **varies** from run to run
- run the simulation **many** times and use the **average** (or range) of the results