

Solutions

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

2.1

- e.g. lignified walls
- give strength/support and waterproofing; *or* no end walls/empty
- continuous open tube for fast water flow

2.2

- any two: companion cell keeps its nucleus (sieve tube loses it); companion cell has many mitochondria; companion cell retains most cytoplasm

3.1 C

- Only xylem vessels have lignified walls and no living contents

3.2 B

- In the root, xylem is central, often star-shaped

3.3

(a)

- $40\text{ mm} = 40\,000\text{ }\mu\text{m}$; magnification = $\frac{40\,000}{50} = \times 800$

(b)

- no contents and no end walls make one continuous open tube, so water flows quickly with little resistance

3.4

- sieve tubes have sieve plates with pores so sap flows through; they lose most contents/nucleus to leave room for flow; companion cells keep a nucleus and many mitochondria to provide ATP and load sugars into the sieve tube