

Solutions

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

2.1

- an agreed set of **rules** for how data is sent and received

2.2 any two:

- the **source** address
- the **destination** address
- the packet's **position/number** in the message

2.3

- 8 bits: $2^8 = 256$
- 10 bits: $2^{10} = 1024$

2.4 any one:

- the Internet is the **network** of connected devices; the Web is a system of linked **pages** that runs **on** it
- the Web uses **HTTP**; the Internet carries many other services too, e.g. e-mail

3.1 B

- packets can take different routes, so some arrive earlier than others

3.2 B

- in a live call, a late packet is useless; speed matters more than resending

3.3 B

- open standards let any maker's devices follow the same rules

3.4

(a) any three:

- the file is split into **packets**
- each packet carries the **destination IP address** and its **sequence number**
- **routers** send each packet along a path; packets may take **different routes**
- the student's computer **reassembles** the packets in order

(b)

- the receiver finds the missing packet number and does **not acknowledge** it / asks for it again
- the server **resends** the packet, and TCP puts all packets **in order**

(c)

- IPv4 has 32-bit addresses, about 4.3 billion: **not enough** for all devices
- IPv6 uses **128** bits, giving vastly more addresses, so the Internet can keep **growing**