Solutions

Marking: **M1** a correct method, **A1** the correct answer, **B1** an independent mark.

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

2.1

`80` gives A; `79` gives B

`60` gives C; `59` gives F

2.2

band `C`

`95 >= 60` is the first true test, so the later branches never run

fix: test `>= 80` first, then `>= 70`, then `>= 60`

2.3

`False`; `True`

`True`

`x > 3` is `True`, so `or` stops and never divides by zero

2.4

`if weight > 20: size = "refuse"` then `elif weight > 2: size = "large"`

`else: size = "small"`, in this order

3.1

(a) (i) £0; (ii) $2.50 + 6.00 = £8.50$; (iii) £4.99

(b)

```
if order >= 50:
    fee = 0
elif member:
    fee = 2.50
else:
    fee = 4.99
if kg > 10:
    fee += 6.00
```

free test first; member then other; weight rule as a separate `if`, not an `elif`; correct comparisons, including `>= 50`

3.2

(a) `True`, which is wrong

(b) 1900 divides by 4, so the first branch wins and the century rule is never checked

(c) `leap = year % 4 == 0 and (year % 100 != 0 or year % 400 == 0)`: the 4 test; the century exception with its 400 rule

(d) e.g. 2024 (ordinary leap), 2023 (not leap), 1900 (century, not leap), 2000 (divides by 400)

3.3

(a) on, off, on, off: **4** switches

(b)

```
if temp < 19.5:
    on = True
elif temp > 20.5:
    on = False
# otherwise on keeps its value
```

lower test turns on; upper test turns off; no `else`, so the state is kept

(c) **0**

(d) $24 \times 60 = 1440$ switches a day; 100,000/1440 $\approx$ **69** days; unacceptable: the dead band cuts switching to a few times a day, so the relay lasts decades

exercises.lol exercises.com.cn