Solutions

Marking: **K** knowledge, **App** use of the case or data, **An** analysis (a chain of reasons: cause, then effect), **Ev** evaluation (a judgement with a reason). In calculations, **M1** is for the method and **A1** for the answer; **B1** is an independent mark.

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

2.1

$1 - 0.95^{10} = \mathbf{0.40}$

2.2

$\dfrac{0.05}{12} = \mathbf{0.0042}$

only $p = 0.003$ passes

2.3

(a) stopping rule (optional stopping)

(b) outcome selection

(c) HARKing

2.4

$520 \pm 1.96 \times 40$

[**442**, **598**] loaves

3.1

(a) $12 \times 0.05 = \mathbf{0.6}$

(b) $1 - 0.95^{12} = \mathbf{0.46}$

(c) threshold $\dfrac{0.05}{12} = 0.0042$; $0.02 > 0.0042$: not significant

(d) treat it as a lead, not a result; test the dessert offer again next week, with the test planned in advance

3.2

(a) $1{,}200 \pm 1.96 \times 90$: [**1**,**024**, **1**,**376**]

(b) $\dfrac{1{,}200}{300} = \mathbf{4}$ riders; $\dfrac{1{,}376}{300} = 4.6$, so **5**

(c) with 4 riders, a busy month (quite likely) leaves orders late; the interval shows the risk the point forecast hides

3.3

7–**8**: multiple testing: with 15 tests, $1 - 0.95^{15} = 0.54$, so a fluke is likely, and Bonferroni needs $p < 0.0033$ (App)(An); the early stop raises the false-positive rate further (An); one store may differ from the others (K); no interval: an 8% rise could be close to 0% (An); but the menu may still be good and is cheap to test again (Ev); recommendation with a condition, e.g. a planned test in 3 random shops for 8 weeks, roll out only if the rise holds (Ev). **4**–**6**: some traps explained, weak use of the numbers or judgement. **1**–**3**: traps named only.

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