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

$\sqrt{200^2 + 200^2}$

$= \mathbf{283}$

2.2

separate $2 \times 1.645 \times 200 = \mathbf{658}$

pooled $1.645 \times 283 = \mathbf{465}$

saving 193, about **29**%

2.3

$(10 - 4) \times 100$

$= \mathbf{600}$ kg

2.4

advantage: a lower price for larger orders, and simpler ordering

disadvantage: if the mill fails, the line stops

3.1

(a) $0.20 \times 30{,}000 = £\mathbf{6{,}000}$

(b) $7 \times \dfrac{30{,}000}{365} \approx 575$ kg; $575 \times 1.20 \approx £\mathbf{690}$

(c) $\approx £\mathbf{5{,}310}$

(d) B is late one delivery in ten, and a late 12-day delivery could stop the line; dual source, e.g. most from A for reliability, some from B for price; keep A's lead time as the back-up and review B's on-time rate

3.2

(a) $3 \times 1.645 \times 150 = \mathbf{740}$

(b) $\sigma = \sqrt{3} \times 150 = 260$; $1.645 \times 260 = \mathbf{427}$

(c) high and low demand for different formats cancel when they share one stock; cost: wrapping must happen fast after the order, needing staff or a machine

3.3

7–8: pooling saves 193 units, about £1,544 a year of holding (App); this is less than the £4,000 of extra transport, so on cost alone the move loses about £2,450 a year (An); a later delivery may lose café customers who need fresh stock in the morning (An); one store also concentrates risk: a fire or flood stops every delivery (K); other benefits, such as less waste of short-life stock, are not priced (Ev); recommendation with a condition, e.g. keep two depots unless waste savings cover the gap; pool only the long-life items centrally (Ev). **4–6**: sound analysis with limited use of the data or a weak judgement. **1–3**: relevant points, mostly descriptive.

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