Solutions

2.1

- Separate $3 \times 1.645 \times 200 = 987$.
- Pooled $1.645 \times 200\sqrt{3} = 570$; saving $417 = 42.3\% = 1 - 1/\sqrt{3}$.

2.2

- Price $0.08 \times 20{,}000 = 1{,}600$ saved.
- Pipeline $8 \times 20{,}000/365 = 438$ kg at $1.60 = 701$; net $+899$.

2.3

- Per format $5 \times 1.645 \times 150 = 1{,}234$; generic $1.645 \times 150\sqrt{5} = 552$.
- Cut $55.3\% = 1 - 1/\sqrt{5}$.

2.4

- Misses $24 \times 0.05 = 1.2$ against $24 \times 0.005 = 0.12$.
- Cost 3,000 against 300: the 2,700 difference wipes out the 899 net - stay, or dual-source.