

Solutions

2.1 No successes means five failures: $0.8^5=0.32768$.

2.2 Binomial variance= $np(1-p)=5\times 0.2\times 0.8=0.8$.

2.3 Standardise: $z=(130-100)/15=2$.

2.4 False. Not every count is binomial: changing p or dependence can invalidate it. For a continuous variable, the probability of one exact value is zero. Continuity correction matters when approximating a discrete distribution by a normal one.

2.5 A The probability-weighted mean of a random variable.

3.1 $1-0.8^5=0.67232$; mean $np=1$. Trials must be independent with constant success probability and fixed count; depletion or correlated outcomes can violate this.