M1 二項、泊松與正態分佈練習 / M1 binomial, Poisson and normal distributions

SketchMath 原創中英練習 / Original bilingual practice · Not official HKEAA papers

先按題目給定的模型和條件選公式。常態標準化須使用標準差，而非方差。
Use the stated model and its conditions. Normal standardisation divides by the standard deviation, not variance.

1.

5 次獨立試驗，每次成功概率 0.2。求恰好成功一次的概率。
There are 5 independent trials with success probability 0.2 each. Find the probability of exactly one success.

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2.

已知 X 服從平均數為 3 的泊松分佈，求 P(X=0)。
X follows a Poisson distribution with mean 3. Find P(X=0).

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3.

X 服從平均 60、標準差 8 的正態分佈，求 P(X>68)。
X is normal with mean 60 and standard deviation 8. Find P(X>68).

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答案及詳解 / Worked solutions

1.

1. X ~ B(5, 0.2)。
   X ~ B(5, 0.2).
2. P(X = 1) = C(5,1)(0.2)(0.8)⁴。
   P(X = 1) = C(5,1)(0.2)(0.8)⁴.

0.4096。
0.4096.

2.

1. P(X = k) = e^(−3)3^k/k!。
   P(X = k) = e^(−3)3^k/k!.
2. 代入 k = 0，並用 0! = 1。
   Substitute k = 0 and use 0! = 1.

e^(−3) ≈ 0.0498。
e^(−3) ≈ 0.0498.

3.

1. z = (68 − 60)/8 = 1。
   z = (68 − 60)/8 = 1.
2. P(X > 68) = P(Z > 1) = 1 − Φ(1)。
   P(X > 68) = P(Z > 1) = 1 − Φ(1).

約 0.1587。
Approximately 0.1587.