Normal distributions

6 questions | 18 marks

Equivalent correct methods earn the corresponding marks.

1. For $X \sim N(40, 9)$, state the mean and standard deviation. [3 marks]

The second parameter is variance 9.

Take its positive square root.

Answer: $\mu = 40$; $\sigma = 3$.

2. A normal model has $\mu = 100$ and $\sigma = 15$. Standardise $x = 85$. [3 marks]

$\frac{85 - 100}{15} = -1$.

Answer: $z = -1$.

3. For $\mu = 60$ and $\sigma = 5$, give the approximate central 68% interval. [3 marks]

Use $\mu \pm \sigma$.

Answer: 55 to 65.

4. For $\mu = 60$ and $\sigma = 5$, give the approximate central 99.7% interval. [3 marks]

Use $\mu \pm 3\sigma$.

Answer: 45 to 75.

5. In a continuous normal model, find $P(X = \mu)$. [3 marks]

A single point has zero interval width and area.

This does not mean values near μ are unlikely.

Answer: 0.

6. A histogram has two well-separated peaks. Is a single normal model automatically justified by knowing its mean and SD? [3 marks]

Investigate distinct groups or another distribution.

Answer: No. The bimodal shape suggests that one bell-shaped model may be unsuitable.