Normal distributions

6 questions | 12 marks

Equivalent correct methods earn the corresponding marks.

1. $X \sim N(12, 9)$. State mean and standard deviation. [2 marks]

The parameters are mean and variance.

Answer: 12 and 3.

2. A normal model has mean 40 and standard deviation 6. Give the central two-SD interval. [2 marks]

$40 \pm 2(6)$.

Answer: $[28, 52]$.

3. Why is the probability at exactly the normal mean not 0.5? [2 marks]

A half-line has probability 0.5; one point has no area.

Answer: A singleton has probability zero.

4. Does doubling the standard deviation change the total density area? [2 marks]

The curve widens and lowers.

Answer: No; it stays one.

5. A waiting-time distribution has a very long right tail. Is a symmetric normal model automatically suitable? [2 marks]

The shape is inconsistent with a normal model; inspect actual behaviour.

Answer: No.

6. $X \sim N(30, 4)$. Estimate $P(28 < X < 32)$ using the empirical rule. [2 marks]

The endpoints are one standard deviation from the mean.

Answer: About 0.68.