Normal-curve features and the 68-95-99.7 rule

6 questions | 13 marks

Equivalent correct methods earn the corresponding marks.

1. A normal model has mean 30 and sd 5. Give the interval containing about 68%. [2 marks]

Use mean ± 1 standard deviation.

Answer: 25 to 35.

2. For the same model, estimate the proportion above 40. [2 marks]

40 is 2 standard deviations above 30; split the 5% outside ± 2 standard deviations into two tails.

Answer: About 2.5%.

3. Estimate the proportion between the mean and 1 standard deviation above it. [2 marks]

Take half of the central 68%.

Answer: About 34%.

4. Estimate the proportion more than 3 standard deviations from the mean. [2 marks]

$100\% - 99.7\% = 0.3\%$, including both tails.

Answer: About 0.3%.

5. A normal model has mean 100 and sd 15. Estimate how many of 800 observations lie from 85 to 115. [2 marks]

The interval is ± 1 standard deviation, so $0.68 \times 800 = 544$.

Answer: About 544.

6. A distribution of waiting times has a long right tail. Is it justified to assume 68% lie within one sd? Explain. [3 marks]

The empirical rule is specific to an approximately normal shape.

A long right tail gives reason to question that model.

Answer: No, not from that information.