Normal probabilities and inverse-normal values

6 questions | 18 marks

Equivalent correct methods earn the corresponding marks.

1. For Z standard normal, calculate P(Z<1.2). [3 marks]

Use the standard normal lower-tail function at 1.2.

Answer: 0.8849.

2. For Z standard normal, calculate P(Z>1.2). [3 marks]

Use 1-Φ(1.2).

Answer: 0.1151.

3. For X with mean 50 and SD 6, find P(44<X<62). [3 marks]

The z-limits are -1 and 2.

Subtract Φ(-1) from Φ(2).

Answer: 0.8186.

4. For X with mean 100 and SD 12, find the 25th percentile. [3 marks]

Use $z=\Phi^{-1}(0.25)$.

Calculate 100+12z.

Answer: 91.91.

5. A normal quality model gives P(pass)=0.94. Out of 250 items, find the expected number passing. [3 marks]

Expected count=250×0.94.

This is an expectation, not a guaranteed realised count.

Answer: 235.

6. Find the upper 5% cutoff for a normal variable with mean 40 and SD 3. [3 marks]

Top 5% means lower-tail area 0.95.

Calculate $40+3\Phi^{-1}(0.95)$.

Answer: 44.93.