Standardisation and z-scores

6 questions | 13 marks

Equivalent correct methods earn the corresponding marks.

1. $X \sim N(40, 25)$. Standardise $X = 47.5$. [2 marks]

$\frac{47.5 - 40}{5} = 1.5$.

Answer: $z = 1.5$.

2. $X \sim N(20, 4)$. Write $P(18 < X < 23)$ using Z. [2 marks]

Standardise each bound using SD 2.

Answer: $P(-1 < Z < 1.5)$.

3. A normal variable has mean 70 and SD 12. Find the value with $z = 0.75$. [2 marks]

$70 + 0.75(12) = 79$.

Answer: 79.

4. Two scores have z-values -0.4 and 1.2. Which is further above its own mean? [2 marks]

It is 1.2 SD above its population mean.

Answer: The score with $z = 1.2$.

5. Does standardising a strongly skewed variable guarantee a normal shape? [2 marks]

Subtracting and scaling do not remove skewness.

Answer: No.

6. $X \sim N(50, 36)$. Find $P(X < 44)$ to four decimal places. [3 marks]

$z = \frac{44 - 50}{6} = -1$.

$P(Z < -1) = 0.1587$.

Answer: 0.1587.