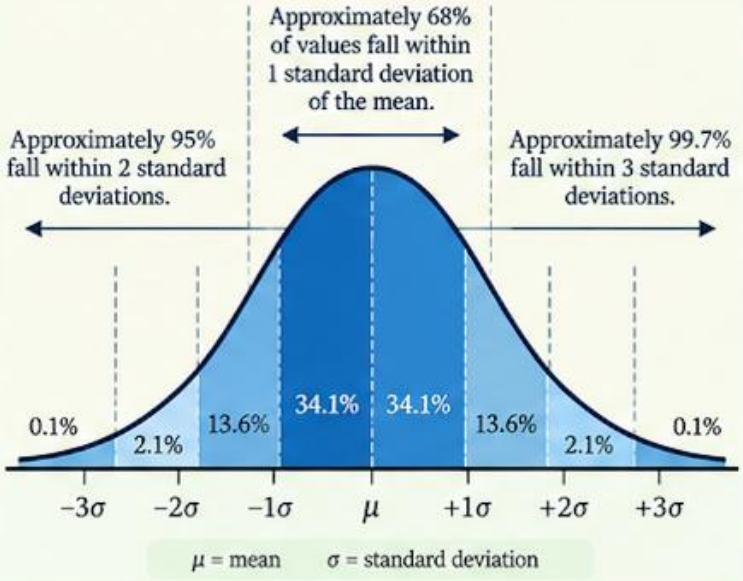
Appendix B

Understanding the Bell Curve

The normal distribution describes how many data values fall at different points around the mean.



What the Bell Curve Tells Us

1. **Center.** The mean (μ) is the middle of the distribution.
2. **Spread.** The standard deviation (σ) shows how much values vary from the mean.
3. **Typical range.** About 68% of values fall within $\pm 1\sigma$, 95% within $\pm 2\sigma$, and 99.7% within $\pm 3\sigma$.
4. **Shape.** The curve is symmetric, with most values near the mean and fewer values at the extremes.

Standard Scores (z-scores)

A z-score tells you how many standard deviations a value is from the mean.

$$z = \frac{X - \mu}{\sigma}$$

X = the observed value
μ = the mean
σ = the standard deviation
z = the standard score

Example: If a score is 10 points above the mean and the standard deviation is 5, then $z = 10/5 = 2$. This score is 2 standard deviations above the mean.