

Assignment 02

Domain Example: Heights of Adult Men

- Suppose we study adult men in a city.
 - Heights are roughly **normally distributed**.
 - Mean (μ) = 70 inches
 - Standard deviation (σ) = 3 inches
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Empirical Rule (68-95-99.7 Rule)

For a normal distribution:

Range % of data (approx)

$$\mu \pm 1\sigma \text{ 68\%}$$

$$\mu \pm 2\sigma \text{ 95\%}$$

$$\mu \pm 3\sigma \text{ 99.7\%}$$

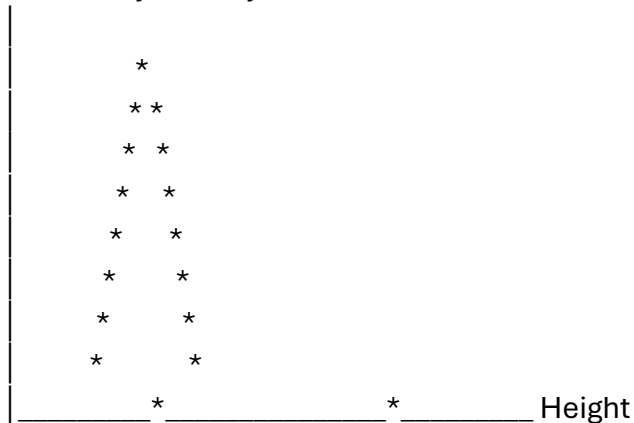
Applied to our example (Height in inches):

- 68% of men \rightarrow 67 to 73 inches
 - 95% of men \rightarrow 64 to 76 inches
 - 99.7% of men \rightarrow 61 to 79 inches
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Normal Distribution Graph

Here's a simplified sketch:

Probability Density



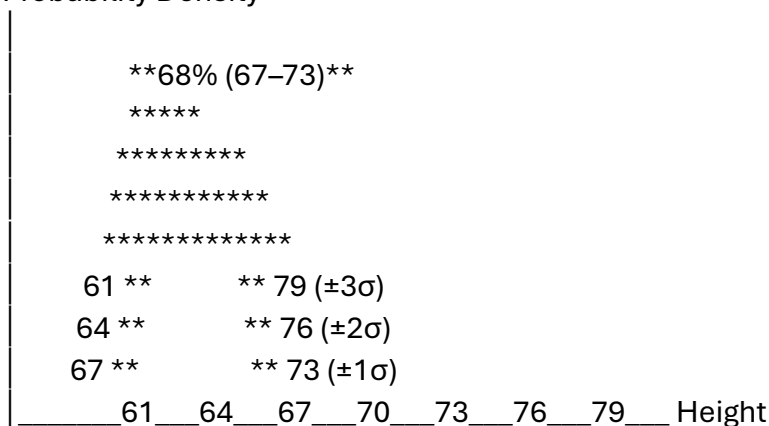
64 67 70 73 76
-2 σ -1 σ μ +1 σ +2 σ

- The **peak** is at mean $\mu = 70$ inches.
- $\pm 1\sigma$ range covers ~68% of the population.
- $\pm 2\sigma$ covers ~95%, $\pm 3\sigma$ covers ~99.7%.

Normal Distribution Graph (Better Visual)

- Bell-shaped curve
- Symmetric around mean μ
- The curve never touches the x-axis
- $\pm 1\sigma$, $\pm 2\sigma$, $\pm 3\sigma$ marked clearly

Probability Density



- **Shaded areas:**
 - Light shade $\rightarrow \pm 1\sigma$ (68%)
 - Medium shade $\rightarrow \pm 2\sigma$ (95%)
 - Darkest shade $\rightarrow \pm 3\sigma$ (99.7%)

3. Real-life Insights

- If you measure 1000 adult men:
 - ~680 men will be 67–73 inches
 - ~950 men will be 64–76 inches
 - ~997 men will be 61–79 inches
- Extreme heights (below 61 or above 79) are **very rare**.

4. How This Relates to Other Domains

Domain	Example Variable	Notes
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Education	Test scores (IQ)	Usually $\mu \approx 100$, $\sigma \approx 15$
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