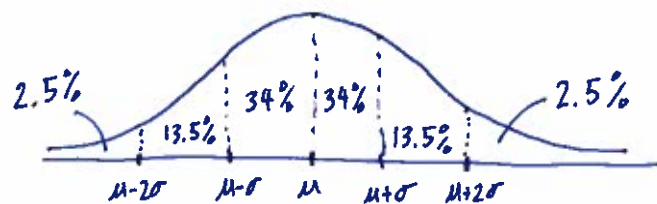


{2.5 Using the Mean and Standard Deviation to Describe Data

The Empirical Rule

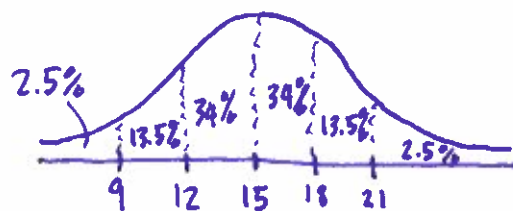
- Symmetric
- Mound Shaped



Example Suppose the PDF is symmetric and mound shaped with $\mu = 15$ and $\sigma = 3$. Find approximate values:

- $P(12 \leq x \leq 18)$
- $P(15 \leq x \leq 21)$
- $P(x > 15)$
- $P(x \leq 9)$
- the interval, centered on the mean that contains about 95% of the data.

Note that in this case:



So (a) $P(12 \leq x \leq 18) \approx 34\% + 34\% = 68\%$



(b) $P(15 \leq x \leq 21) \approx 34\% + 13.5\% = 47.5\%$



(c) $P(x > 15) \approx 50\%$



(d) $P(x \leq 9) \approx 2.5\%$



(c) 95% of the data (area under the curve) is $\mu - 2\sigma < x < \mu + 2\sigma$ or $9 < x < 21$.

The PDF could be a histogram, a relative frequency chart or a graph that approximates a histogram.