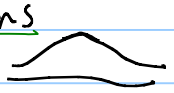
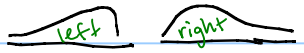
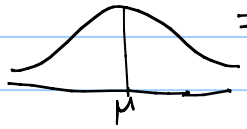
Stats Unit Summary

Note Title 15/06/2010

- Population vs. Sample
- Measures of Central Tendency, Spread, & Distribution
  - Mean: $\bar{x}$ (average) $\Rightarrow \left(\frac{x_1+x_2+x_3+\cdots+x_n}{n}\right)$
  - Median: middle # $\left(M_d = \frac{n+1}{2}\right)$
  - Mode: most frequently occuring #
  - μ = population mean, $\bar{x}$ = sample mean
  - σ = population st. deviation, s_x = sample st. dev.
  - Distributions
    - Normal: 
    - Bi-model: 
    - Skewed: 

    - Uniform 
- Normal Curve (little chart)



  - $\Rightarrow$ controlled by the standard deviation
  - $\frac{x-\mu}{\sigma}$ = # of st. devs away from the mean
- Z-score (2 charts)
  - $z = \frac{x-\mu}{\sigma}$ (chart gives you decimal #)
    - change into %
- Sampling Methods Lab
  - know the different types of samples!
- Sampling Distribution
  - dealing w/ averages
    - mean ($\bar{x}_{\bar{x}}$ or $\mu_{\bar{x}}$) & st dev ($\sigma_{\bar{x}}$)
- Central Limit Theorem
  - Only applies if the sample is random (SRS ideal)
  - If $n \geq 30$, then the sampling distribution will be approx. normal (if it wasn't already)
  - Centre of the sampling distribution is equal to the mean of the original population
    - $\bar{x}_{\bar{x}} = \mu$ or $\mu_{\bar{x}} = \mu$
  - Standard deviation: $\sigma_{\bar{x}} = \sigma/\sqrt{n}$
- Confidence Intervals
  - best way to estimate μ (population mean)
  - 2 parts: Interval itself & confidence level
  - the higher the confidence, the larger the interval
  - CI: $\bar{x} \pm z\left(\frac{\sigma}{\sqrt{n}}\right)$ → margin of error
    (point estimate)

★ Need to know conditions! ★

- SRS? (no, use caution) } If not, use t-interval
- $n \geq 30$?
- know σ?
  - yes = z-interval, no = t-interval
- meaning of the CI? (write a sentence)

- Radicals (think "square root")
  - Simplifying
    - look for perfect squares
      - eg: $\sqrt{12} = \sqrt{4 \cdot 3} = \sqrt{4} \cdot \sqrt{3} = 2\sqrt{3}$
      - eg: $2\sqrt{27} = 2\sqrt{9 \cdot 3} = 2\sqrt{9}\sqrt{3} = 2 \cdot 3 \cdot \sqrt{3} = 6\sqrt{3}$
  - Adding/Subtracting
    - can only do when we have like terms (# under $\sqrt{}$ are the same) ★ May have to simplify first ★
      - $\sqrt{8} + \sqrt{2} = \sqrt{4 \cdot 2} + \sqrt{2} = \sqrt{4}\sqrt{2} + \sqrt{2} = 2\sqrt{2} + \sqrt{2} = 3\sqrt{2}$
  - Multiplying/Dividing
    - Multiply/divide outside #s, & the #s underneath the $\sqrt{}$
      - $3\sqrt{2}(4\sqrt{6}) = 12\sqrt{12} = 12\sqrt{4}\sqrt{3} = 12 \cdot 2 \cdot \sqrt{3} = 24\sqrt{3}$
      - $\frac{10\sqrt{12}}{5\sqrt{6}} = 2\sqrt{2}$