

LAB SESSION 4 – SAMPLING DISTRIBUTIONS

Analytics Primer

WEBPAGE HITS

Example

- Assume the average daily number of web page hits a company gets follows a normal distribution with a mean of 2341.36 and s.d. of 516.79.

Example

- What is the probability that a sample of 49 days over the past year has an average web page hit above 2500?

$$z_{\bar{x}} = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}} = \frac{2500 - 2341.36}{516.79/\sqrt{49}} = 2.15 \rightarrow 0.0158$$

Example

- What is the probability that a sample of 121 days over the past year has an average web page hit above 2500?

$$z_{\bar{x}} = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}} = \frac{2500 - 2341.36}{516.79/\sqrt{121}} = 3.38 \rightarrow 0.0004$$

Example

- Recall your sample of 49 days over the past year. What if the distribution of web page hits wasn't normal? Does this impact your analysis or assumptions?

YES! Without a large sample size ($n > 50$), we need normality of the distribution of webpage hits to be able to use the calculation.

RETAIL STORE SALES

Example

- Assume that I own a chain of retail stores located at major cities across the country. The daily sales in thousands of dollars at each store has a mean of 17.06 and a s.d. of 5.12.

Example

- What is the probability that a sample of 64 of my stores averages sales of more than \$19K?

$$z_{\bar{x}} = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}} = \frac{19 - 17.06}{5.12/\sqrt{64}} = 3.03 \rightarrow 0.0012$$

Example

- I am worried about one of my managers performance in retail sales. They manage 100 of my stores and they only average \$14.35K in sales per day. What is the probability I randomly select 100 of my stores and get sales numbers that low?

$$z_{\bar{x}} = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}} = \frac{14.35 - 17.06}{5.12/\sqrt{100}} = -5.29 \rightarrow 0$$