Stat 7  Class 22  10-31-19

\[
\frac{1000}{60} = 16 \text{ hours}
\]

\[P(\text{coming out ahead after 1000 $1$ bets on a single}) =
\]

\[P_F(S > 0)
\]

2 ways: 1) math
2) computer simulation

**Ex. 5-61**

<table>
<thead>
<tr>
<th>Imaginary data set</th>
<th>All possible</th>
</tr>
</thead>
<tbody>
<tr>
<td>$S_{-61}$</td>
<td>$\bigcdot$</td>
</tr>
<tr>
<td>$S_{-25}$</td>
<td>$M \to \infty$</td>
</tr>
<tr>
<td>...</td>
<td>$\bigcdot$</td>
</tr>
</tbody>
</table>

\[\sum S = ?
\]

**Ex. 5-25**

long run mean: expected value of $S = \text{EV of } S = E_{\text{iid}}(S) = ?$

long run SD: standard error of $S = \text{SE}$

long run hist.

\[E_{\text{iid}}(S) = \left( \text{# of draws} \right) \left( \text{individual mean} \right) = nM \to 1000$ .05 $\}

**HR-22**

Formula 2*

\[E_{\text{iid}}(S) = -52
\]
The long run histogram of $S^*$ after $n=1000$ $\$1$ bets on single #, you expect to have won

![Graph showing CLT with $\mu = $0.52, $\sigma = $0.182, and 39% confidence interval]

$\text{EV} = (0 - 52) \pm 0.182$

$\text{EV of } S^* = 1M \pm 52, \text{ give or take}$

(Standard error of $S^*$) = $0.182$

$\text{(SE of } S^*) = SE_{IID}(S) = \sigma$

$SE_{IID}(S) = \sqrt{\frac{\sum (y_i - \mu)^2}{n}}$

$S$ is uncertain, $SE_{IID}(S)$ represents how much uncertainty we have about $S$

Information ↑ $\rightarrow$ Uncertainty ↑ and vice versa

$S^*$ is uncertain because

$S^* = (y_1, \ldots, y_n)$ and each of the $y_i$ is uncertain

The pop SD $\sigma$ represents how much uncertainty we have about each of the $y_i$

As $\sigma \uparrow$, $SE_{IID}(S) \uparrow$
\[\sum_{n=1}^{N} x = \sum_{n=1}^{N} \frac{S_n}{SE_{III}(S')} \]

\[SE_{III}(S') = \sigma \sqrt{n}\]

\[(R-22)\]

\[\sigma_5 \pm 6(\sqrt{1080}) = 3182\]

\[\bar{y} = \frac{1}{n} \sum_{i=1}^{n} y_i = \frac{S}{n}\]

\[\text{R-63} \quad \text{R-54}\]