Discussion Section 4 #2

R-67 | AMS 7 | 29 Oct 09

(6th section)

①

pop: all underground riders etc first hour

sample: the observed people

imag data: possible values of S

weight → (like SRS = IID) → weight, $n = 192$

$N = ?$ (big)

sum $S = ?$ (ex. 30459)

IID

$n = 192$

sum $S = ?$ (ex. 30201)

30459
30201
⋮

$M = \infty$

mean $\mu = 158$ lb.

SD $\sigma = 33$ lb.

pop hist.

long run mean: EV of S ① $= 30336$

long run SD: SE of S ② $= 457$ lb.

long run hist ③: SE 457, 30336

① EV of $S = E_{IID}(S)$

$= n\mu = (192)(158 \text{ lb.}) = 30336$ lb.

② SE of $S = SE_{IID}(S) = \sigma\sqrt{n}$

noise = uncertainty

$SE(\bar{y}) = \frac{\sigma}{\sqrt{n}}$

$= 33 \text{ lb} \sqrt{192} = 457$ lb.

$P(\text{overload}) = P(\bar{x} > 31400 \mid 16) = ?$ (2)

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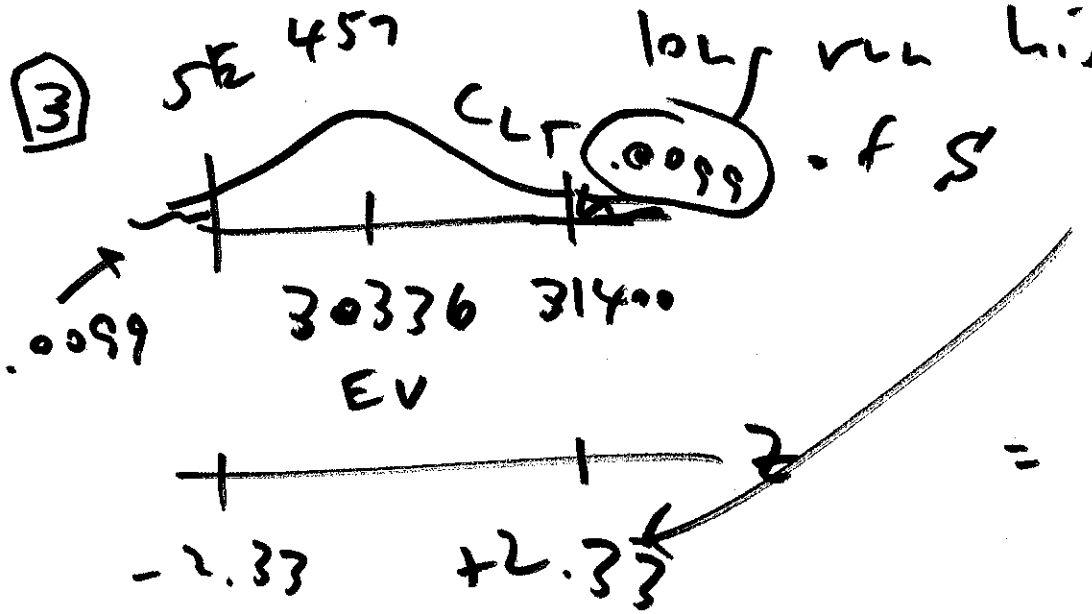
(3) SE 457 CLT long run list .0099 of $\bar{x}$



$$\frac{30336 - 31400}{457} = \frac{1064}{457} \approx 2.33$$

= 1%

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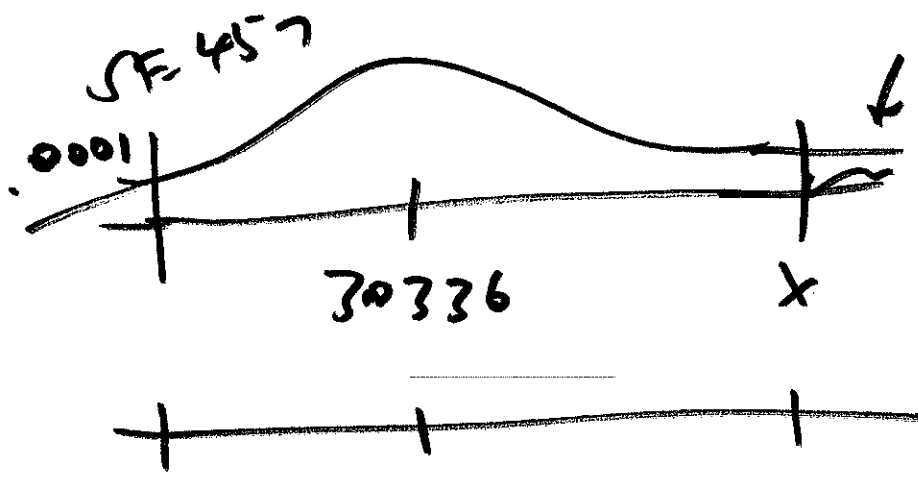
go full trip/day: $\frac{100}{90} = 1.1$ days

it would fail every



$\frac{1}{10000} = .0001$

$$\frac{x - 30336}{457} = 3.72$$

$x = (457)(3.72) + 30336 \approx 32036$ lb.

tolerance	failure rate	only ...
31400 lb	1/100	extra 636 lb.
32036	1/10000	(about

4 extra people) is enough to drive failure rate down to $\frac{1}{10000}$

DS 5 #1 (R-73)

pop: all transactions at Fine

sample: the observed transactions

imag. data: possible $\bar{y}$'s

expenses (actual)

$N = ?$ (big)

(like) SRS $\doteq$ IID

expenses

$n = 40$

mean $\bar{y} = ?$

$M = \infty$

mean $\mu = ?$

SD $\sigma \doteq \$1800$

hyp: IID

$n = 40$

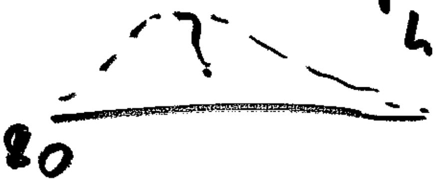
mean $\bar{y} = ?$

long run mean

long run SD

long run hist

pop. hist.



judge happy if $\bar{y}$ differs from μ by no more than \$500: $P(|\bar{y} - \mu| < \$500) \doteq 0.95$