

this large-time: sample
 next analysis time: ↓

read: DS ch. 6

AMS 131
 28 Aug 17

DD office hours this week: Mon 11.30 am - 12.30 pm
 Bartin And.

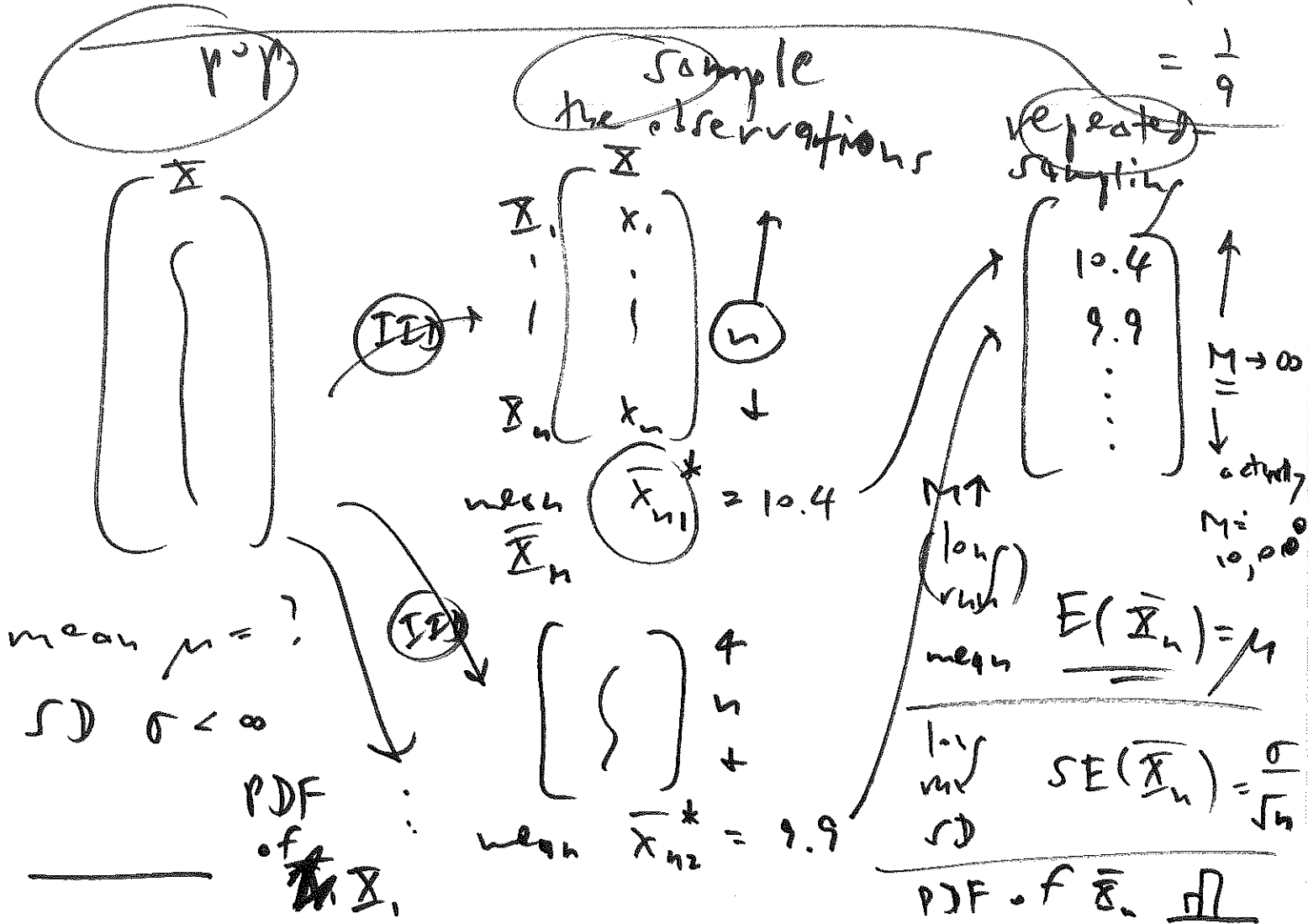
tue: 10 - 11 am Jack's Lounge

wed 11.30 am - 12.30 pm Bartin And.

Fri

Th ~~10:30 am~~
 11 am - noon
 Jack's Lounge

$$P\left[\left|\frac{\bar{X} - \mu}{\sigma}\right| \geq 3\right] = P\left[\left|\bar{X} - \mu\right| \geq \underline{3\sigma}\right] \leq \frac{\sigma^2}{(3\sigma)^2} = \frac{1}{9}$$



Q: How close is \bar{X}_n to μ ? ②

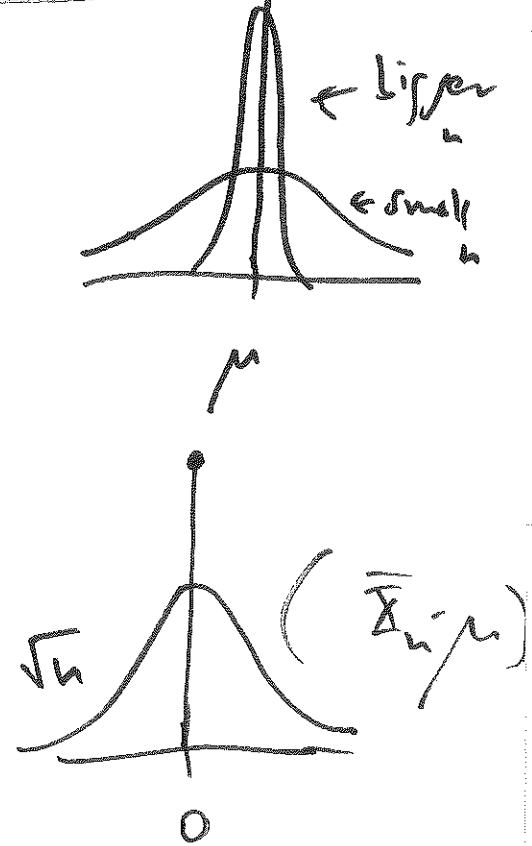
$$E(\bar{X}_n) = \mu$$

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

(SD)

PDF
of \bar{X}_n

(9.55)



$P(\text{escalator } \underline{\text{breaks}})$

$$= P(S > 31,400 \text{ lb}) = ?$$

lead **Pb**
plumber

$$E(S) =$$

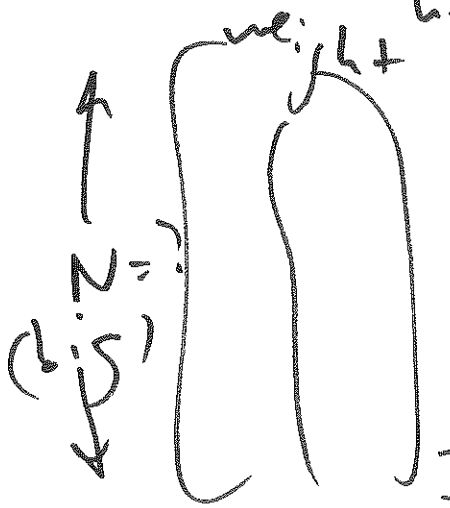
$$E\left(\sum_{i=1}^n X_i\right)$$

$$30,336 \text{ lb} = (192)(158 \text{ lb}) = \textcircled{n\mu} = \sum_{i=1}^n E(X_i)$$

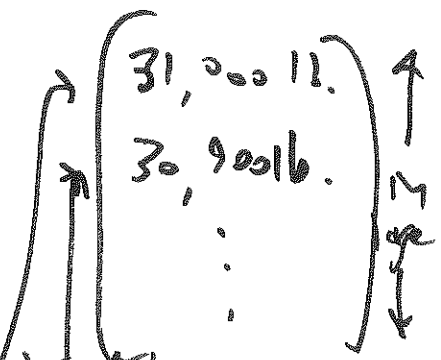
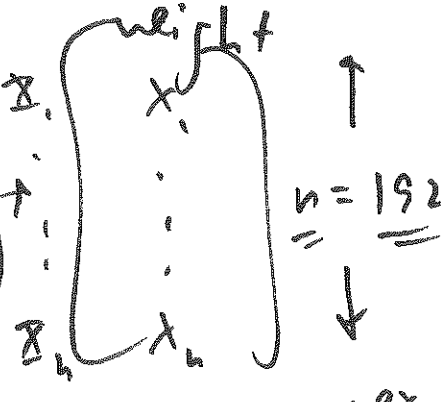
pop. all possible tube views at work

sample the observed people

repeated sampling (possible sums)



like SRS = IID



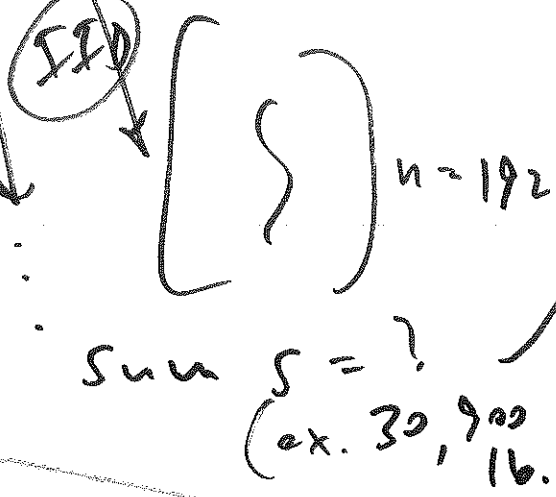
mean $\mu = 158$ lb.
SD $\sigma = 33$ lb.

mean $\bar{x}_n = ?$ (ex. 31,000 lb.)
sum $S = \sum x_i = ?$

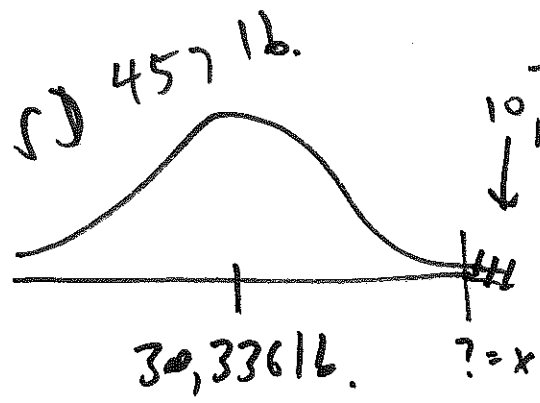
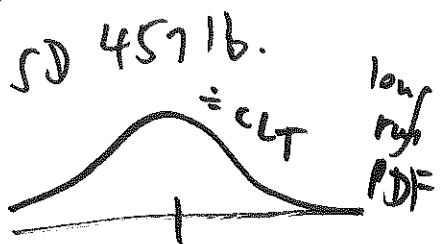
$E(S) = n\mu = 192 \times 158 = 30,336$ lb.



pop. PDF



$\sqrt{V(S)} = 457$ lb.
SD = 457 lb.



$\frac{1}{10,000} = .0001$

$$= 32,036 \text{ lb.}$$

$$S_0 \quad x = 30,336 \text{ lb.}$$

$$+ (3.719) \cdot (457 \text{ lb.})$$

$$\frac{x - 30,336 \text{ lb.}}{457 \text{ lb.}} = 3.719$$

$$V(\bar{X}) = V\left(\frac{1}{n} \sum_{i=1}^n X_i\right) \stackrel{\text{IID}}{=} \frac{1}{n} \sum_{i=1}^n V(X_i) \quad \textcircled{5}$$

$= n\sigma^2$ σ^2

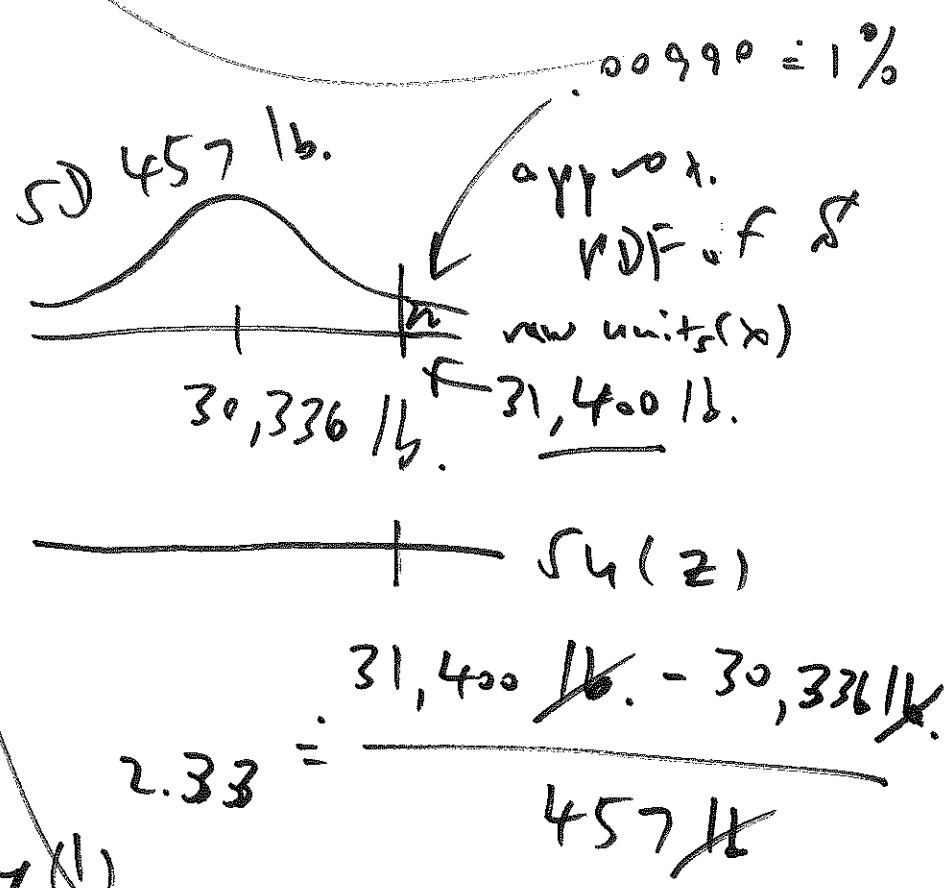
$$SD(\bar{X}) = \sqrt{V(\bar{X})}$$

$$= \sigma \sqrt{n}$$

$$SD(\bar{X}_n) = 33 \text{ lb.} \sqrt{192}$$

$$= SE(\bar{X}_n) \approx 457 \text{ lb.}$$

$$= \frac{\sigma}{\sqrt{n}}$$



go fully loaded trip
 day: expect
 about 1 failure/day (1)

engineering
tolerance

$P(\text{break down})$ ← single trip

(5)

31,400 lb.

.01

1

10,000

32,036 lb.

.0001

←

about

every

90 days

(10.58)