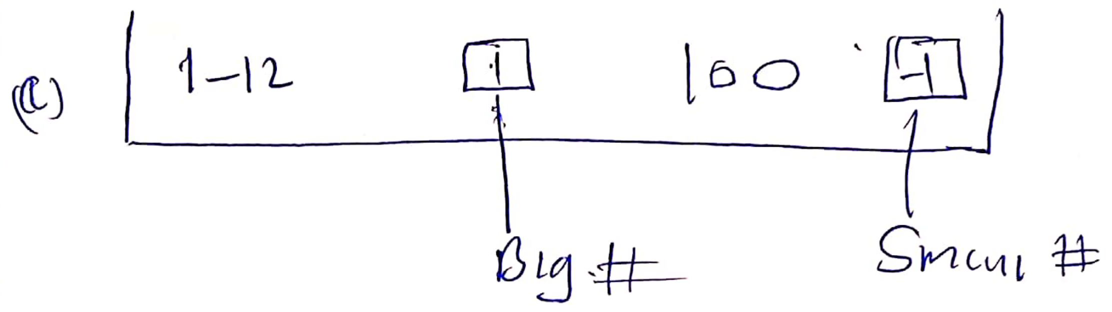
1

(a)



(b)

$$\text{Ave box} = \frac{\left[\#\text{ of big tickets}\right](\text{Big }\#) + \left[\#\text{ of Small tickets}\right](\text{Small }\#)}{\left[\#\text{ of big tickets}\right] + \left[\#\text{ of Small tickets}\right]}$$

$$= \frac{31.6(1) + 68.4(-1)}{31+68} = \frac{-36.8}{100}$$

$$= -0.368$$

$$S.D = (1-(-1))\sqrt{\left(\frac{31.6}{100}\right) \times \left(\frac{62.8}{100}\right)}$$

$$= 0.89095$$

①

(c) Expected value $= 0.368 \times 50$

$= \$18.4$

Standard error $= 0.39095 \times 50$

$= \$ 44.5475$

2 (a) $\dfrac{1(1) + (5)(-1)}{(1+5)} = \dfrac{1-5}{6} = -\frac{4}{6} = -\frac{2}{3}$

Expected value $= \frac{2}{3} \times (200) = 133\frac{1}{3}$

$SD\ box = (1-(-1)) \sqrt{\left(\frac{1}{6}\right)\left(\frac{5}{6}\right)} = 0.7454$

Expected standard error

$= 0.7454 \times 200$

$= 149.071$

2 (c) 1 2 3 4 5

2 4

$\frac{1}{2} \times 200 = 100$ draws

Average box $= \frac{2(1) + (4)(-1)}{2+4} = \frac{2-4}{6}$

$= -\frac{2}{6} = -\frac{1}{3}$

$SD = 1-(-1) \sqrt{\left(\frac{2}{6}\right)\left(\frac{4}{6}\right)} = 0.9428$

(d) $Av = \frac{3(1) + 5(-1)}{1+5} = \frac{3-5}{6} = -\frac{2}{6} = -\frac{1}{3}$

EXP value $= \frac{1}{3} \times 200 = 66\frac{2}{3}$

$SD_{box} = 1-(-1) \sqrt{\left(\frac{1}{6}\right)\left(\frac{5}{6}\right)} = 0.7454$

Expected value of Standard error

$= 0.7454 \times 200 = 149$

3 $n=500$

In general, the Central limit Theorem tells us that Sum of random Variables will approximately follow the normal curve if Sample size or number of trials become large. In Particular Situation, we can justify using this theorem because the normal curve to estimate the shape of the distribution of a data set

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4 (i) Graph "b"

(ii) Graph "a"

(iii) Graph "d"

(iv) Graph "c"

6 5 (a) Response biase

(b) Non-response biase

(c) Selection biase

6 (a)

375 (1)	125	30 (-1)
0.75	0.25	

(b) Average of the ticket $= \frac{375}{500} = 0.75$

(b) $SD = \sqrt{0.75 \times 0.25} = 0.4330$

(c) Expected value of sum $= 0.75 \times 30$

$= 22.5$

Expected value Std error $= \sqrt{30}\,(0.4330)$

$= 2.3716$

Scanned with CamScanner

6 (b) · 1500

(d) $n = 30$

No ⇒ The central limit theorem states that normal approximation is used for sufficiently large sample sizes

7. Population$_1$ = 121,000 — Berkeley
Population$_2$ = 425,000 — Oakland

(c) Sample more people in Berkeley
(large samples are most accurate)

- Large samples are more accurate than small samples

8. 68% — male
n = 200

$0.68 \times 200 = 136$
$0.6 \times 200 = 120$
$< 60\% = 80$

~~0.68 × 80~~ =

$$\frac{80}{200} = 0.4$$