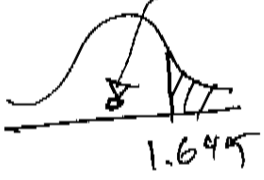
(1) $H_0: \cancel{\mu}\, p = .75$ $\quad H_A: p > .75$

data

| $n$ | $\cancel{x}$ | $\hat{p}$ |
|---|---|---|
| 1000 | 770 | .77 |

$$z = \frac{.77 - .75}{\sqrt{.75(.25)/1000}} = 1.46$$

cv




ACCEPT

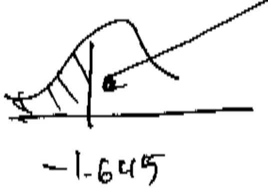
(2) $H_0: p = .05$ $\quad H_A: p < .05$

data

| $n$ | $\cancel{x}$ | $\hat{p}$ |
|---|---|---|
| 250 | 8 | $8/250 = .032$ |

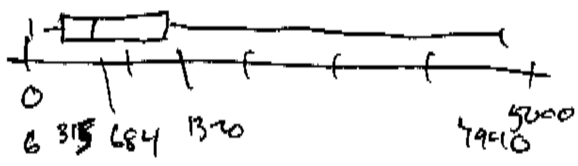
$$Z = \frac{.032 - .05}{\sqrt{.05(.95)/250}} = -1.3$$

obs.



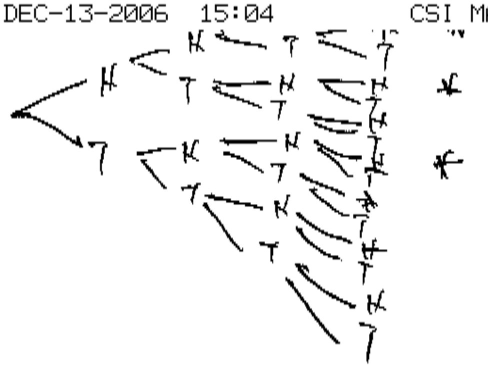

ACCEPT.

3. ignore mean




4. $\text{p.r.} = \dfrac{4 + \frac{1}{2} \times 1}{11} \times 100\%$ or 40% $\quad z = \dfrac{21 - 25.09}{15.92} = -.25$

5. 4 events (HHHT, HHTH, HTHH, THHH) $\dfrac{4}{16}$ = probability



1 events w/ 3 heads.

---

6. $P[\text{Green or Blue}] = \dfrac{\#\ \text{Green or Blue}}{\#\ \text{in Bag}} = \dfrac{15}{30}$

7. $25 \times 25 \times 25 \times 9 \times 9 \times 9$

8. $\underset{\text{stick, automatic}}{2} \times \underset{\text{color}}{3} \times \underset{\text{sunroof}}{2}$

9. ${}_5P_3 = \dfrac{5\cdot4\cdot3\cdot\cancel{2\cdot1}}{\cancel{2\cdot1}} = 60$

$\binom{8}{4} = \dfrac{8!}{4!\,4!} = \dfrac{8\cdot7\cdot6\cdot5}{4\cdot3\cdot2\cdot1} = \dfrac{7\cdot6\cdot5}{3} = 7\cdot2\cdot5 = \underline{70}$

$\binom{50}{4} = \dfrac{50\cdot49\cdot48\cdot47}{4\cdot3\cdot2\cdot1} = 50\cdot49\cdot2\cdot47$

$\binom{n}{2} = \dfrac{n(n-1)}{2}$

10 $8! = {}_8P_8$

11 ${}_{12}P_2 = 12\cdot11$

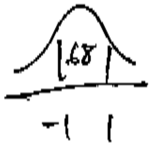
12. ${}_{12}C_5$

13. $5\times.25 + 10\times.25 + 15\times.40 + 20\times.10$

$= 9.95$

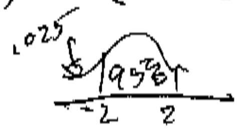
**14** $P[50 \le X \le 70]$ find z-score

a) $= P\left[\frac{50-60}{10} \le Z \le \frac{70-60}{10}\right] = P[-1 < Z < 1] = .68$

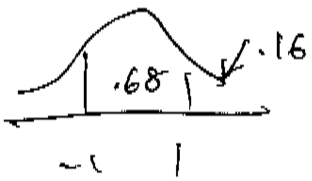



b) $P(X < 80) = P\left[Z < \frac{80-60}{10}\right] = P[Z < 2] = .95 + .025$

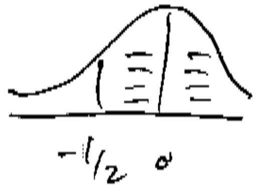
$= .975$




c) $P(X > 70) = P\left[Z > \frac{70-60}{10}\right] = P[Z > 1] = .16$




**15** $P(55 < X) = P\left(\frac{55-60}{10} < Z\right) = P\left(-\frac{1}{2} < Z\right) =$

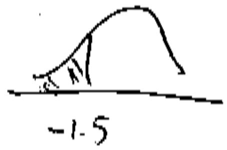



$= \frac{1}{2} + $

| | .00 |
|---|---|
| 0.5 | $\boxed{.1915}$ |

$= .6915$

$P(X < 45) = P\left(Z \le \frac{45-60}{10}\right) = P(Z \le -1.5) =$

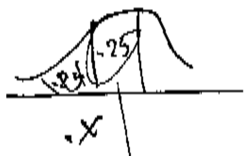



$= \frac{1}{2} - $

| | .00 |
|---|---|
| 1.5 | $\boxed{.4332}$ |

$= .0668$

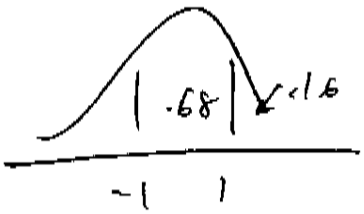
**16** $P(X < x) = .25$ z-score




| | 0.07 |
|---|---|
| 0.6 | .2486 |

$x = \mu + z\sigma = 100 + .67 \times 25$

17 $P(X > 375) = P\left(Z > \frac{375-400}{25}\right) = P(Z > -1)$

$=$ 

$= .68 + .16$

18. $P(X \leq 175) \approx P\left(Z \leq \frac{175 - np}{\sqrt{np(1-p)}}\right)$

$= P\left(Z \leq \frac{175 - 400 \cdot \frac{1}{2}}{\sqrt{400 \cdot \frac{1}{2} \cdot \frac{1}{2}}}\right)$

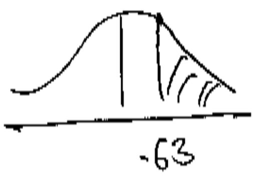
$= P\left(Z \leq \frac{-25}{10}\right) = P(Z \leq -2.5) = \frac{1}{2} - \begin{array}{c|c} & .00 \\ \hline 2.5 & \boxed{.4938} \end{array}$

$= .0062$

19. $n = 10000$, $p = \frac{1}{1000}$

$np = 10 \quad \sqrt{np(1-p)} = \sqrt{10\left(1 - \frac{1}{1000}\right)} \approx 3.16$

$P(X \geq 12) \approx P\left(Z \geq \frac{12 - np}{\sqrt{np(1-p)}}\right) = P\left(Z \geq \frac{12-10}{3.16}\right) = P(Z \geq .63)$



$= \frac{1}{2} - \begin{array}{c|c} & .03 \\ \hline .06 & \boxed{.2357} \end{array} = .2643$

20. $\hat{p} = \frac{325}{1000} = .325 \quad SE = \sqrt{\frac{\hat{p}(1-\hat{p})}{n}} = .0148 \quad MOE = 1.96 \times .0148 = .02$

CI: $.325 \pm .02$

21. $n$ $\cancel{X}$ $\hat{p}$

2018 1070 $1070/2018 = .53$

$H_0: p = .5 \quad H_A: p > .5$

$$Z = \frac{\hat{p} - p}{\sqrt{\frac{p(1-p)}{n}}} = \frac{.53 - .5}{\sqrt{\frac{.5(.5)}{2018}}} = 2.69$$ observed value

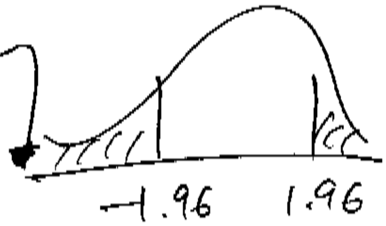
critical value


REJECT

22 $H_0: p = .5 \quad H_A: p \neq .5$

$\hat{p} = .16 \quad n = 200$

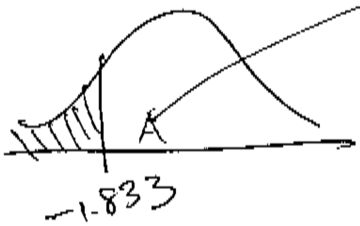
$$Z = \frac{.16 - .5}{\sqrt{\frac{.5 \times .5}{200}}} = -9.6$$




REJECT.

23 $H_0: \mu = 8 \quad H_A: \mu < 8$

$$T: \frac{7-8}{2/\sqrt{10}} = \frac{-1}{2}\sqrt{10} = -1.58$$

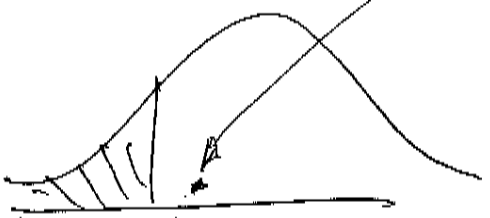



c.v.

| df | $t_{0.05}$ |
|---|---|
| 9 | $\boxed{1.833}$ |

24. $H_0: \mu_1 = \mu_2$ $\quad H_A: \mu_1 < \mu_2$.

$$T = \frac{5.3 - 5.4}{\sqrt{\frac{2.5^2}{200} + \frac{2.5^2}{207}}} = -.403$$



$-1.645$

ACCEPT

25 use $S = 10$.

$H_0: \mu = 65$ $\quad H_0: \mu < 65$

| $n$ | $\bar{X}$ | $S$ |
|---|---|---|
| 21 | 59 | 10 |

$$T = \frac{\bar{X} - \mu}{s/\sqrt{n}} = \frac{56 - 65}{10/\sqrt{21}} = -4.12$$

$-1.725$

| | $t_{0.05}$ |
|---|---|
| 20 | $\boxed{1.725}$ |

REJECT