$$\therefore \Rightarrow \frac{(262-220)^2}{220} + \frac{(234-220)^2}{220} + \frac{(204-220)^2}{220}$$

$$+ \frac{(190-220)^2}{220} + \frac{(210-220)^2}{220}$$

$X_0^2 \Rightarrow$ 14.618

$X^2_{crit} \Rightarrow$ 9.488.

Since $X^2_{crit} < X^2$, hence reject hypothesis.

→ Hypothesis testing.

1. $\mu = 2.75$ $\quad n = 256.$

$\sigma = 0.65$

$\bar{X} = 2.85.$

a) Null hypothesis. : grades remain same.

Alternate : grades varied.

b) Sample Standard deviation = 0.65

= Standard error.

c) Two sided test with 0.025 on both sides.

d) $\sigma_{SD} = \frac{\sigma_{samp}}{\sqrt{n}} = \frac{0.65}{\sqrt{256}}$

$Z = \frac{\bar{X} - \mu}{\sigma} = \frac{2.85 - 2.75}{0.04} = 2.5$

Since 2.5 greater than 2 (95%.) Reject

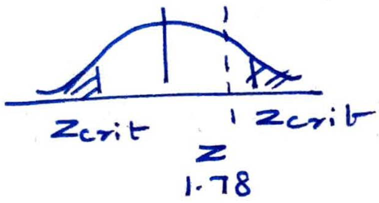
2. Hypothesis mean is same

Alternative mean is different.

$\mu = 52$; $n = 100$, $\sigma = 4.50$; $\bar{x} = 52.8$

$$z = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}} = \frac{52.8 - 52}{4.50/10} = 1.78.$$

Since 95% CI.



Since 1.78 lies in region, accept that $\mu = 52$.

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3. $\mu = 34$ Hypothesis. 0.01 Significance

$\mu \neq 34$ Alternate.

$\mu = 34$

$\sigma = 8$

$n = 50$

$\bar{x} = 32.5$

$$z = \frac{32.5 - 34}{8/\sqrt{50}}$$

$$= -1.33$$

Zcrit $\Rightarrow$ $-2.58 \rightarrow 2.58$

Since -1.33 lies in region, accept hypothesis.

4). Pop1 : SS Pop2 : NSS

$n_1 = 300$ $n_2 = 700$

$\bar{x}_1 = 120$ $\bar{x}_2 = 140$

$\sigma_1 = 0.53$ $\sigma_2 = 0.20$

$H_0 :- \mu_1 - \mu_2 \leq 0.10$

$H_1 \quad \mu_1 - \mu_2 > 0.10$

$$z^* = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}} = \frac{120 - 140 - 0.10}{\sqrt{\frac{(0.53)^2}{300} + \frac{(0.20)^2}{700}}}$$

$$z = \frac{\cancel{-20 - 0.10}}{} \quad - 23.17$$

Since -23.17 greater than critical range of 10%. the hypothesis is rejected. hence. prizes are offered 10%. higher for buyers with sweepstakes on.

5.

41	25
19	25
24	25
16	25

chi-square $X^2 = 14.96$

$X^2_{crit} = 7.815.$

Since X^2 greater than X^2_{crit}, hence hypothesis rejected and candidates are not equally popular.

6. Hypothesis $\mu_1 = \mu_2 = \mu_3$

Alternate ; atleast 1 is different.

$\alpha = 0.05$; $df_1 = 3 - 1 = 2.$

$df_2 = 15 - 3 = 12.$

							μ	Variance
A_1	86	79	81	70	84	400	80	~~30.8~~
A_2	90	76	88	82	89	425	85	~~28~~
A_3	82	68	73	71	81	375	75	~~30.8~~

Variance within = ~~89.6~~. 37.3//

Variance between.

$$\frac{5(400-400)^2 + 5(25)^2 + 5(25)^2}{2}$$

$= 3125$

$\therefore \frac{3125}{37.3} = 83.78$ Since large hypothesis fails.

7. $\mu = 145 cm$

$\sigma = 20 cm$

$n = 200$

$\bar{x} = 147 cm$

Null : $\mu \leq 145$

Alternate: $\mu > 145$

$\alpha = 0.05$.

$$z = \frac{147 - 145}{20/\sqrt{200}} = 1.414$$

Since one-tailed, at 95% $z_{crit} = 1.64$.

Since $z < z_{crit}$ and accept that heights have remained same.

8. $\mu = 145$

$\sigma = 100$

$\bar{x} = 147$

$n = \cancel{100}\ 144$

Null $\mu \leq 145$

Alternate $\mu > 145$.

$$z = \frac{147 - 145}{100/\sqrt{144}} = 0.24$$

at $\alpha = 0.05$

95% $z_{crit} = 1.64$.

$0.24 < 1.64$. Hence accept Null hypothesis.

9. a) Hypothesis $\Rightarrow \mu = 72$

Alternate $\Rightarrow \mu \neq 72$

b) Given $\mu = 72$.

$$\bar{x} \Rightarrow \frac{70 + 69 + 73 + 68 + 71 + 69 + 71}{7}$$

$$\Rightarrow 70.142.$$

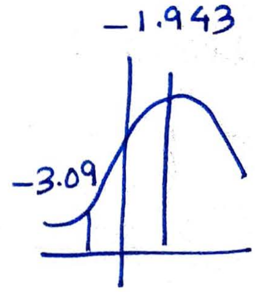
$\therefore$ Since ~~σ~~ n is small, can use t-test.

$$t = \frac{70.142 - 72}{\sigma / \sqrt{7}}$$

~~σ's~~ ~~Variance~~

Variance $= 2.528$ $\therefore \sigma = 1.590$.

$t = -3.09$



c). $df = 6$ at 10% $= -1.943$ $\Rightarrow$ Reject

at 5% $= -2.447$ $\Rightarrow$ Reject

at 1% $= -3.707$ $\Rightarrow$ Accept.