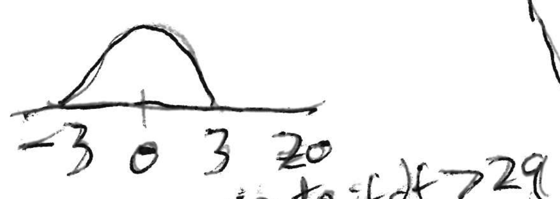
F1

H0	key words	assumptions	test	table for pvalues (line)	CI
$\mu = \mu_0$ 10 ← point in ch 10	mean = value mean of quantitative variable $\bar{Y}$, σ given computations seldomly appear on my exams	σ known CLT holds random sample	Z test for μ $Z_0 = \dfrac{\bar{Y}-\mu_0}{\sigma/\sqrt{n}}$ p497	Z	Z int for μ $\bar{Y} \pm z_{\frac{\alpha}{2}} \dfrac{\sigma}{\sqrt{n}}$ p413
$\mu = \mu_0$ 10.5 10.7 10.9 15 and 18	mean = value mean of quantitative variable $\bar{Y}$, s given always on final, exam 4	σ unknown CLT holds random sample	t test for μ $t_0 = \dfrac{\bar{Y}-\mu_0}{s/\sqrt{n}}$ p.470, 491	$df = n-1$ t if $df \le 29$ Z if $df > 29$	t int for μ $\bar{Y} \pm t_{\frac{\alpha}{2}} \dfrac{s}{\sqrt{n}}$ if $df \le 29$ $\bar{Y} \pm z_{\alpha/2} \dfrac{s}{\sqrt{n}}$ if $df > 29$ p.426
$\mu_1 - \mu_2 = 0$ 10.11 16	2 groups n_1 $\bar{Y}_1$ s_1, n_2 $\bar{Y}_2$ s_2 } ind random samples difference in means, mean1 $\gtrless$ mean2 fair chance to be on exams	σ_1, σ_2 unknown CLT holds for both samples, samples are ind.	2 sample t $t_0 = \dfrac{\bar{Y}_1-\bar{Y}_2}{\sqrt{\frac{s_1^2}{n_1}+\frac{s_2^2}{n_2}}}$ see p473	Z if $n_1 \ge 30$ and $n_2 \ge 30$ $df \ge \min(n_1-1, n_2-1)$	2 sample t int for $\mu_1-\mu_2$ $\bar{Y}_1-\bar{Y}_2 \pm z_{\frac{\alpha}{2}} \sqrt{\dfrac{s_1^2}{n_1}+\dfrac{s_2^2}{n_2}}$ if $n_1 \ge 30$, $n_2 \ge 30$ p415
$\mu_1 - \mu_2 = D_0$ usually $D_0 = 0$	2 groups n_1 $\bar{Y}_1$ s_1, n_2 $\bar{Y}_2$ s_2 } ind random samples told $\sigma_1 = \sigma_2$ difference in means, mean1 $\gtrless$ mean2 computations seldomly appear on my exams	$\sigma_1 \approx \sigma_2$ or $\sigma_1^2 \approx \sigma_2^2$ CLT holds for both samples, samples are ind.	pooled t test $t_0 = \dfrac{\bar{Y}_1-\bar{Y}_2-D_0}{s_p\sqrt{\frac{1}{n_1}+\frac{1}{n_2}}}$ p493 $s_p^2 = \dfrac{(n_1-1)s_1^2+(n_2-1)s_2^2}{n_1+n_2-2}$ ← p402	$df = n_1+n_2-2$ t if $df \le 29$ Z if $df > 29$	Pooled t int $\bar{Y}_1-\bar{Y}_2 \pm t_{\frac{\alpha}{2}} s_p\sqrt{\frac{1}{n_1}+\frac{1}{n_2}}$ if $df \le 29$ $\bar{Y}_1-\bar{Y}_2 \pm z_{\frac{\alpha}{2}} s_p\sqrt{\frac{1}{n_1}+\frac{1}{n_2}}$ if $df > 29$ p430
$p = p_0$ 10.15 14	proportion, percentage or count of a categorical variable fair chance to be on exams	random sample $n > 9\dfrac{p_0}{1-p_0}$, $n > 9\dfrac{1-p_0}{p_0}$ } test $n > 9\dfrac{\hat{p}}{1-\hat{p}}$, $n > 9\dfrac{1-\hat{p}}{\hat{p}}$ } CI	z test for p $Z_0 = \dfrac{\hat{p}-p_0}{\sqrt{\frac{p_0(1-p_0)}{n}}}$ p470	Z	Z interval for p $\hat{p} \pm z_{\frac{\alpha}{2}}\sqrt{\dfrac{\hat{p}(1-\hat{p})}{n}}$ p414
$p_1 - p_2 = 0$ 10.17 17	n_1 Y_1 or $\hat{p}_1$, n_2 Y_2 or $\hat{p}_2$ } ind random samples Y = # of successes fair chance to be on exams	$n_i > 9\dfrac{p_i}{1-p_i}$, $n_i > 9\dfrac{1-p_i}{p_i}$ } test $n_i > 9\dfrac{\hat{p}_i}{1-\hat{p}_i}$, $n_i > 9\dfrac{1-\hat{p}_i}{\hat{p}_i}$ } CI	2 sample z test for p_1-p_2 $Z_0 = \dfrac{\hat{p}_1-\hat{p}_2}{\sqrt{\hat{p}(1-\hat{p})\left(\frac{1}{n_1}+\frac{1}{n_2}\right)}}$ $\hat{p} = (n_1\hat{p}_1+n_2\hat{p}_2)/(n_1+\ldots$	Z	Z interval for p_1-p_2 $\hat{p}_1-\hat{p}_2 \pm z_{\frac{\alpha}{2}}\sqrt{\dfrac{\hat{p}_1(1-\hat{p}_1)}{n_1}+\dfrac{\hat{p}_2(1-\hat{p}_2)}{n_2}}$ p413

i) reject H_0 if $p_{val} \le \alpha$, fail to reject H_0 if $p_{val} > \alpha$

ii) If t_0 or z_0 is far in the tail(s) given by H_A, usually reject H_0. If t_0 or z_0 is not at all far in the tail, usually fail to reject H_0

a) right tail (given by H_A)	$H_A >$	t_0 or z_0 > largest value	$p_{val} = 0$ or $< .005$
		< smallest value	$p_{val} = 1$ or $> .995$
		between 2 values	p_{val} between 2 right tail pvalues
b) left tail	$H_A <$	t_0 or z_0 > largest value	$p_{val} = 1$ or $> .995$
		< smallest value	$p_{val} = 0$ or $< .005$
		between 2 values	p_{val} between 2 left tail pvalues
c) two tail	$H_A \neq$	t_0 or z_0 > largest value, < smallest value	$p_{val} = 0$ or $< .01$
		between 2 values	P value between 2 twotail pvalues



F1.5

(MENSA wants IQ 130 or higher)

F2

ex) μ = mean IQ of M483 students $n=36$

$100-2(15) = 70 \approx$ moron = retarded

a) $H_0\ \mu=60$ $H_A\ \mu>60$ $\bar{x}=120,\ s=15$

$$t_0 = \frac{\bar{x}-\mu_0}{s/\sqrt{n}} = \frac{120-60}{15/\sqrt{36}} = 24.0$$

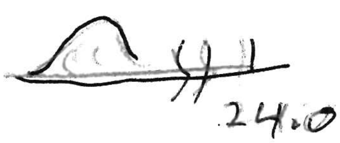
$$\begin{array}{c|c} z & 2.576 \\ & .005 \end{array}$$ right tail

pval = 0 < 0.005

reject Ho, mean M483 IQ is higher than 60

b) $H_0\ \mu=60$ $H_A\ \mu<60$

$t_0 = 24.0$



pval = 1 > 0.995

$$\begin{array}{c|c} z & 2.576 \\ & .995 \end{array}$$ left tail

fail to reject Ho

no evidence that mean Math 483 IQ is less than 60 } "politically correct"

Here Ho is absurd, but H_A is even more absurd.