Answer Sheet

1	9.5% ✓	15	0.12 ✓
2	24.5% ✓	16	$0.513 < p < 0.753$ ✓ ✓
3	93.2% ✓	17	4269 ✓
4	83.7% ✓	18	$\mu = 5$ ✓
5	69.5% ✓	19	$\pm$ 1.96 ✓ ✓
6	94.2 ✓	20	6.50 ✓
7	65.2 ✓	21	The sample does not support the claim ✓
8	1.13 ✓	22	$p \leq 0.45$ ✓
9	$21.47 < \mu < 23.73$ ✓ ✓	23	2.33 ✓
10	38 ✓	24	-0.28 ✓
11	0.64 ✓	25	The sample supports the claim ✓
12	$4.86 < \mu < 6.14$ ✓ ✓	26	$\mu \geq 250$ ✓
13	$1.1 < 6^2 < 4.9$ ✓ ✓	27	-1.314 ✓
14	$1.0 < 6 < 22$ ✓ ✓	28	4.633 ✓

25 ✓

(29) The sample supports the claim ✓

East Los Angeles College
Department of Mathematics
Math 227TTh
Test 3

Your actual exam will not have these many questions, but should serve as an adequate predation for the exam.

The Lifespan of residents of Hawaii are normally distributed with a mean of 73.6 years and a standard deviation of 12.5 years. What percent of Hawaiians live for:
Approximate your answers to the nearest tenths.

1. More than 90 years?
2. Less than 65 years?
3. At least 55 years?
4. Between 55 and 90 years?
5. No more than 80 years?
6. What age represent the top 5%?
7. What age represents the 1st Quartile?

A survey of 120 college professors reveal they miss a mean of 22.6 office hours in a semester with a standard deviation of 4.8 hours. Use the 99% confidence level to:

8. Determine the margin of error associated with estimating the true mean. **Hundredths**
9. Estimate the true mean using the 99% confidence level. **Tenths**
10. Estimate the sample size need for a new study using the past standard deviation and a 99% confidence level with a margin of error of 2 hours. **Whole Number**

A survey of 15 Mathematics Professors reveal that they miss a mean of 5.5 classes per year with a standard deviation of 1.4 classes. Use the 90% confidence level to:

11. Determine the margin of error associated with estimating the true mean. **Hundredths**
12. Estimate the true mean using the 90% confidence level. **Tenths**
13. Estimate the true variance using the 95% confidence level. **Tenths**
14. Estimate the true standard deviation using the 95% confidence level. **Tenths**

A survey of 60 elementary school children reveal that 38 report not owning an iPad. Use the 95% confidence level to:

15. Determine the margin of error associated with estimating the true proportion. **Hundredths**
16. Estimate the true proportion using the 95% confidence level. **Tenths**
17. Estimate the sample size need for a new study using the 95% confidence level and assuming no past sample proportion information is available. **Whole Number**

Professor Snodgrass believes that the mean number of students who drop before census is 5. A sample of 75 college students report a mean of 6.2 with a standard deviation of 1.6. Use the 5% level of significance to create a hypothesis test and answer the following questions.

18. What is the claim?
19. What are the critical value(s) associated with this hypothesis test?
20. What is the test statistic?
21. What is your conclusion?

Professor Snodgrass believes that no more than 45% of her students own a social media account. A sample of 200 college students report that 88 students own a social media account. Use the 1% level of significance to create a hypothesis test and answer the following questions.

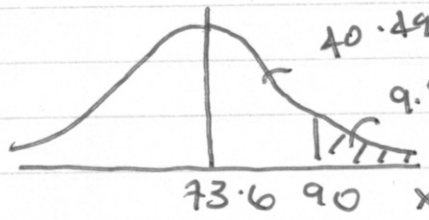
22. What is the claim?
23. What are the critical value(s) associated with this hypothesis test?
24. What is the test statistic?
25. What is your conclusion?

Campus Vice Presidents believe students spend a mean of at least $ 250 per semester on books and supplies. A sample of 28 college students report spending a mean of $ 262.45 with a standard deviation of $ 14.22. Use the 10% level of significance to create a hypothesis test and answer the following questions.

26. What is the claim?
27. What are the critical value(s) associated with this hypothesis test?
28. What is the test statistic?
29. What is your conclusion?

Math 227 Test 3

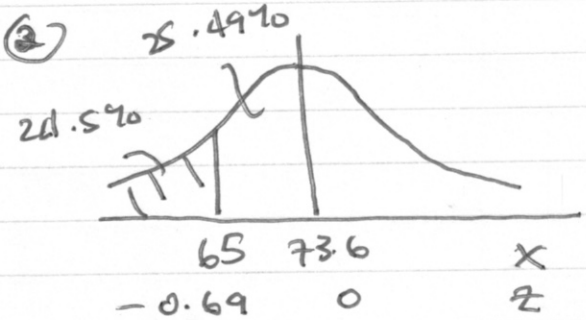
x = lifespan ; $\mu = 73.6$; $\sigma = 12.5$

① 

$$z = \frac{90 - 73.6}{12.5}$$

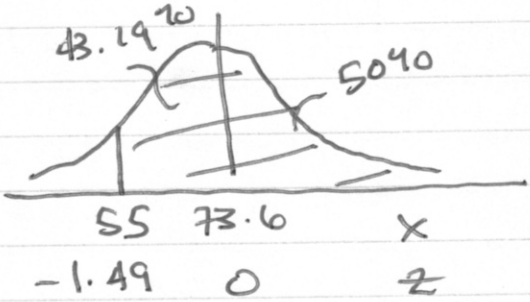
$z \approx 1.31$

$50 - 40.49 = |9.51\%| \approx 9.5\%$

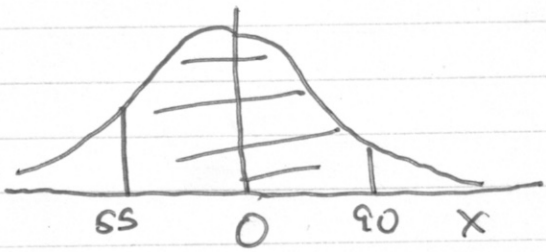
② 

$$z = \frac{65 - 73.6}{12.5}$$

$50\% - 25.49\% = 24.51\% \approx 24.5\%$

③ 

$$z = \frac{55 - 73.6}{12.5}$$

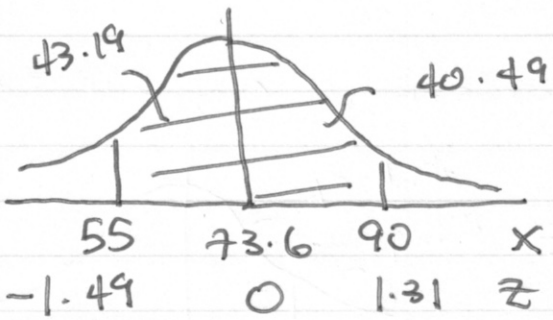
④ 

$50 + 43.19 = 93.19$

$\approx 93.2\%$

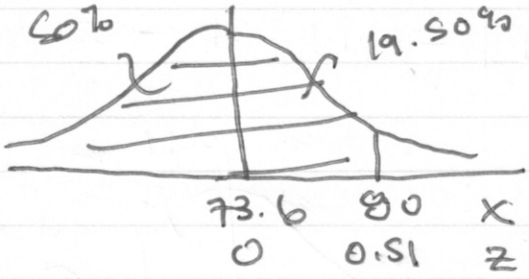
(see next page)

④



$43.19 + 40.49 \approx 83.68\% \approx \boxed{83.7\%}$

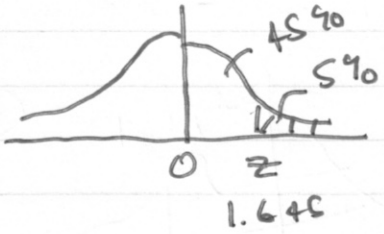
⑤



$$Z = \frac{80 - 73.6}{12.5}$$

$50 + 19.50 = 69.50\% \approx \boxed{69.5\%}$

⑥ $X = \mu + Z \cdot 6$; $X = 73.6 + 12.5\,Z$

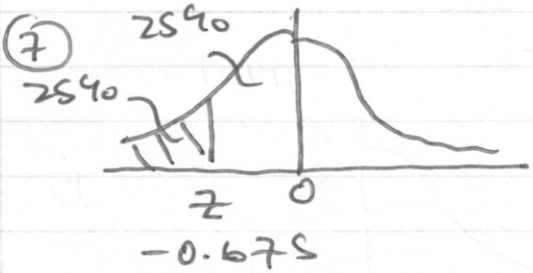


$\Leftarrow 1.645$

$X \approx 73.6 + 12.5 \cdot 1.645$

$X \approx \boxed{94.2}$

⑦



$X \approx 73.6 + 12.5Z$

$\Leftarrow -0.675$

$X \approx 73.6 - 12.5 \cdot 0.675$

$X \approx \boxed{65.2}$

(8) $\bar{x} - E < \mu < \bar{x} + E$

$E = z_{\alpha/2} \frac{s}{\sqrt{n}}$;

$E = 2.575 \cdot \frac{4.8}{\sqrt{120}}$

$E \approx 1.13$

large Sample

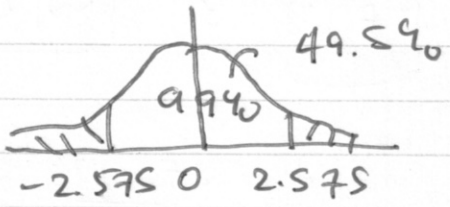
Sample

$n = 120$

$\bar{x} = 22.6$

$s = 4.8$

99% conf



(9) $22.6 - 1.13 < \mu < 22.6 + 1.13$

$21.47 < \mu < 23.73$

99% conf

(10) $n = \left(\frac{z\sigma}{E} \right)^2 = \left(\frac{zs}{E} \right)^2$

$n = \left(\frac{2.575 \cdot 4.8}{2} \right)^2$; $n \approx 38$

(11) $\bar{x} - E < \mu < \bar{x} + E$

$E = t_{\alpha/2} \frac{s}{\sqrt{n}}$

$E = 1.761 \cdot \frac{1.4}{\sqrt{15}}$

$E \approx 0.64$

Sample

$n = 15$ (Small Sample)

$\bar{x} = 5.5$

$s = 1.4$

$\alpha = 10\%$ (two tails)

note $df = 14$

$t_{\alpha/2} = 1.761$

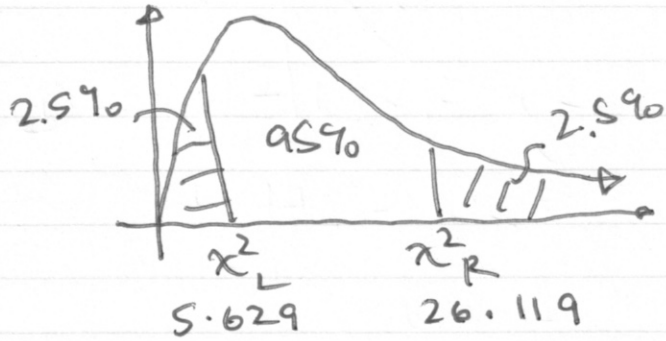
(12) $5.5 - 0.64 < \mu < 5.5 + 0.64$

$4.86 < \mu < 6.14$

90% conf

(13) $\frac{(n-1)S^2}{\chi^2_R} < \sigma^2 < \frac{(n-1)S^2}{\chi^2_L}$

$df = 14$



$\frac{14 \cdot 1.4^2}{26.119} < \sigma^2 < \frac{14 \cdot 1.4^2}{5.629}$

$1.1 < \sigma^2 < 4.9$

95% conf

(14) $\sqrt{1.1} < \sigma < \sqrt{4.9}$

$1.0 < \sigma < 2.2$

95% conf

(15) $\bar{p} - E < p < \bar{p} + E$; Sample

$n = 60$ (large)

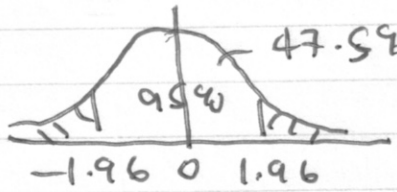
$x = 38$

95% conf

$$E = z_{\alpha/2}\sqrt{\frac{\bar{p}(1-\bar{p})}{n}}$$

$$E = 1.96\sqrt{\frac{0.633 \cdot 0.367}{60}}$$

$$E \approx 0.12$$



note $\bar{p} = \frac{x}{n}$

$\bar{p} = \frac{38}{60}$

$\bar{p} \approx 0.633$

$1 - \bar{p} \approx 0.367$

(16) ~~0.633~~ $- 0.12 < p < 0.633 + 0.12$

$0.513 < p < 0.753$

95% conf

(17) $n = \frac{z^2 \bar{p}(1-\bar{p})}{E^2}$; $z = 1.96$, $E = 0.015$

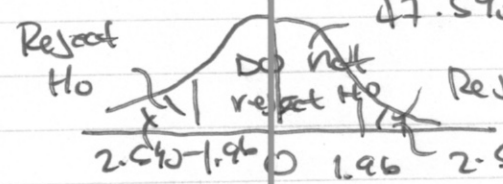
$n = 1.96^2 \cdot 0633 \cdot 0.$

$n = \frac{1.96^2 \ 0.5 \cdot 0.5}{0.015^2}$; $n \approx 4,269$

(18) $\mu = 5$; $H_0 : \mu = 5$ claim

$H_1 : \mu \neq 5$

(19) ± 1.96



(20) $TS = \dfrac{\bar{x} - \mu}{s/\sqrt{n}}$

$TS = \dfrac{6.2 - 5}{1.6/\sqrt{75}}$

$TS \approx 6.50$

Sample

$n = 75$

$\bar{x} = 6.2$

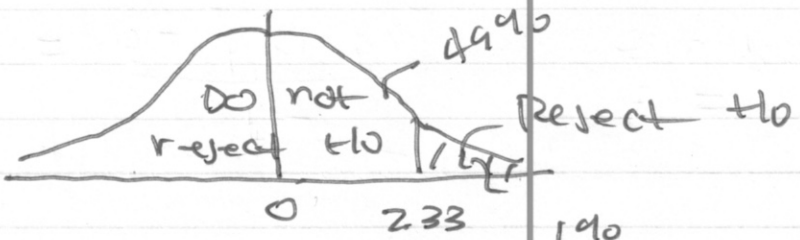
$s = 1.6$

(21) Reject H_0 ; The sample does not support the claim.

(22) $p \leq 45\%$ or $p \leq 0.45$

$H_0 : p \leq 0.45$ claim

$H_1 : p > 0.45$



(23)

CV $\approx$ 2.33

(24) $TS = \dfrac{\bar{p} - p}{\sqrt{\dfrac{p(1-p)}{n}}}$

Sample

$n = 200$

$x = 88$

$\bar{p} = \dfrac{88}{200} \approx 0.44$; $1 - \bar{p} \approx 0.56$,

$TS = \dfrac{0.44 - 0.45}{\sqrt{\dfrac{0.45 \cdot 0.55}{200}}}$

$TS \approx -0.28$

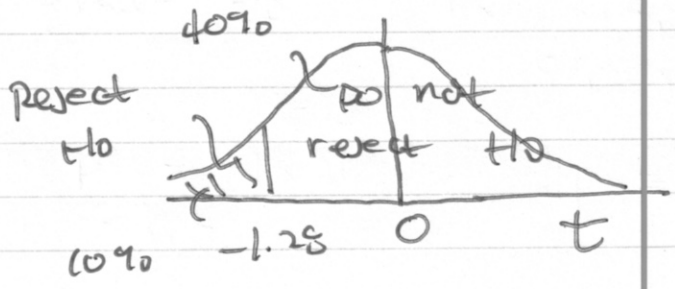
Do not reject H_0;

(25) The Sample supports the claim

(26) $\mu \geq 250$

$H_0 : \mu \geq 250$ claim

$H_1 : \mu < 250$



Sample

$n = 28$ (Small)

$\bar{x} = 262.45$

$s = 14.22$

(27) $CV = -1.314$

$df = 27$

$\alpha = 10\% = 0.10$

(one tail)

t-table

(28) $TS = \dfrac{\bar{x} - \mu}{s/\sqrt{n}}$

$TS = \dfrac{262.45 - 250}{14.22/\sqrt{28}}$; $TS \simeq 4.633$

(29) Do not reject H_0;

The Sample supports the claim