95% confidence interval for the mean temperature for men

$$\bar{x} \pm t^* \frac{s}{\sqrt{n}}$$

What is t^*?

we need $n = 10$ and 95% confidence

$$t^* = 2.2622$$

$$\bar{x} = 97.88$$

$$s = .5553777$$

$$97.88 \pm (2.2622) \cdot \left(\frac{.5553777}{\sqrt{10}}\right) = \begin{cases} 97.482699 \\ 98.2773008 \end{cases}$$

95% confidence for females

$$\begin{cases} 98.143 \\ 98.897 \end{cases}$$

Identify the test (circle one):

1. Significance test for one proportion (1-PropZTest)
2. Significance test for the difference of two proportions (2-PropZTest)
3. Significance test for a mean (T-Test)
4. Significance test for the difference of two means (2-SampTTest)

Data: Significance level $\alpha =$ .05

Other: (depending on the test, circle and give the necessary values)

$p_0 =$	$\hat{p} =$	$\overline{x} =$ 1050
$\mu_0 =$ 1015	$\hat{p}_1 =$	$\overline{x}_1 =$
$n =$ 64	$\hat{p}_2 =$	$\overline{x}_2 =$
$n_1 =$	$x_1 =$	$s =$ 150
$n_2 =$	$x_2 =$	$s_1 =$
	$x =$	$s_2 =$

Check the conditions:

1. The sample was obtained at random.
2. The sample size $n=64$ is big enough (greater than 40)
3. $10n = 640 <$ total number of students at this particular university

State the hypotheses:

H_0: $\mu = \mu_0$

H_a: $\mu > \mu_0$

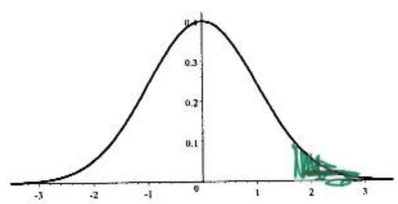
where (circle and describe in words the appropriate symbol(s): $p, p_1, p_2, \mu, \mu_1, \mu_2$)

μ = true mean number of hours students study every week.

Compute the test statistic, p-value, and label and complete the sketch:

Test statistic: $\boxed{t = \dfrac{\bar{x} - \mu_0}{s/\sqrt{n}}}$ = 1.8666

formula



P-value = .0333016

Is the sample significant? Yes

Yes/No

Conclusions:

(Circle one) We reject/don't reject the null hypothesis.

Explain in context.

Because the P-Value = .033016 < .05, we reject the null hypothesis in favor of the alternate. If the mean number of hours of study time per week was 1015 minutes, then it would be unlikely (probability 3.33%) to get a sample of 64 random students with a larger mean than 1050. So we have evidence to assert that indeed the average study time per week is larger than 1015.

Identify the test (circle one):

1. Significance test for one proportion (1-PropZTest)
2. Significance test for the difference of two proportions (2-PropZTest)
3. Significance test for a mean (T-Test)
4. Significance test for the difference of two means (2-SampTTest)

Data: Significance level $\alpha =$ .05

Other: (depending on the test, circle and give the necessary values)

$p_0 =$	$\hat{p} =$	$\overline{x} =$ 92.9286
$\mu_0 =$ 93	$\hat{p}_1 =$	$\overline{x}_1 =$
$n =$ 15	$\hat{p}_2 =$	$\overline{x}_2 =$
$n_1 =$	$x_1 =$	$s =$ .1118587
$n_2 =$	$x_2 =$	$s_1 =$
	$x =$	$s_2 =$

Check the conditions:

1. Measurements were obtained at random times and places.
2. The data looks normally distributed except for an outlier. We'll do the test with and without the outlier.
3. $10n = 150 <$ total number of measurements from earth to sun (infinitely many)

State the hypotheses:

H_0 : $\mu = \mu_0$

H_a : $\mu \neq \mu_0$

where (circle and describe in words the appropriate symbol(s): $p, p_1, p_2, \mu, \mu_1, \mu_2$)

$\mu =$ true average distance from the earth to the sun.

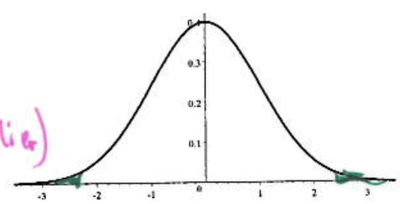
Compute the test statistic, p-value, and label and complete the sketch:

Test statistic: $\boxed{t = \dfrac{\overline{x} - \mu_0}{s/\sqrt{n}}}$ = -2.469836

formula

$= -6.2792$ (without the outlier)

P-value = .0269928 (.0000283)



Is the sample significant? Yes

Yes/No

Conclusions:

(Circle one) We reject/don't reject the null hypothesis.

Explain in context.

Because P-Value = .02699 < .05 we reject the null hypothesis in favor of the alternate.

If the average distance from the earth to the sun was 93 million miles, then it would be unlikely (probability 2.69%) to get a sample of 15 measurements as extreme or more than the one we analyzed.

Furthermore, if we remove the outlier of 93.28, then the probability becomes .00283%. So we have ample evidence to assert that the A.U. is not equal to 93 million miles.

Identify the test (circle one):

1. Significance test for one proportion (1-PropZTest)
2. Significance test for the difference of two proportions (2-PropZTest)
3. Significance test for a mean (T-Test)
4. Significance test for the difference of two means (2-SampTTest)

Data: Significance level $\alpha =$ .05

Other: (depending on the test, circle and give the necessary values)

$p_0 =$	$\hat{p} =$	$\overline{x} =$ 43.3
$\mu_0 =$ 42	$\hat{p}_1 =$	$\overline{x}_1 =$
$n =$ 40	$\hat{p}_2 =$	$\overline{x}_2 =$
$n_1 =$	$x_1 =$	$s =$ 5.06
$n_2 =$	$x_2 =$	$s_1 =$
	$x =$	$s_2 =$

Check the conditions:

1. The sample is not a random sample. We'll proceed but be very wary of our results.
2. The sample size n=40 is big enough
3. 10n = 400 < total number of owners of 2007 Honda Civic Hybrid

State the hypotheses:

H_0 : $\mu = \mu_0$

H_a : $\mu > \mu_0$

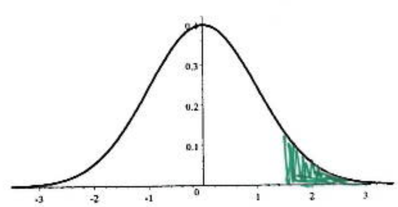
where (circle and describe in words the appropriate symbol(s): $p, p_1, p_2, \mu, \mu_1, \mu_2$)

μ = true average mpg for 2007 Honda Civic Hybrid Cars. that their owners would report.

Compute the test statistic, p-value, and label and complete the sketch:

Test statistic: $\boxed{t = \dfrac{\overline{x} - \mu_0}{s/\sqrt{n}}}$ = 1.6249

formula



P-value = .0561

Is the sample significant? No

Yes/No

Conclusions:

(Circle one) We reject/don't reject the null hypothesis.

Explain in context.

Because P-Value = .0561 > .05 we don't reject the null hypothesis. If the average mpg the owners would report is 42mpg then it is likely to get a sample of 40 owners with $\bar{x} = 43.3$ and $s = 5.06$ or more extreme (Probability of this is 5.61%)

So we have no evidence to assert that the actual mpg the owners would report is larger than 42.

95% confidence interval for

"bottom" − "mid depth"

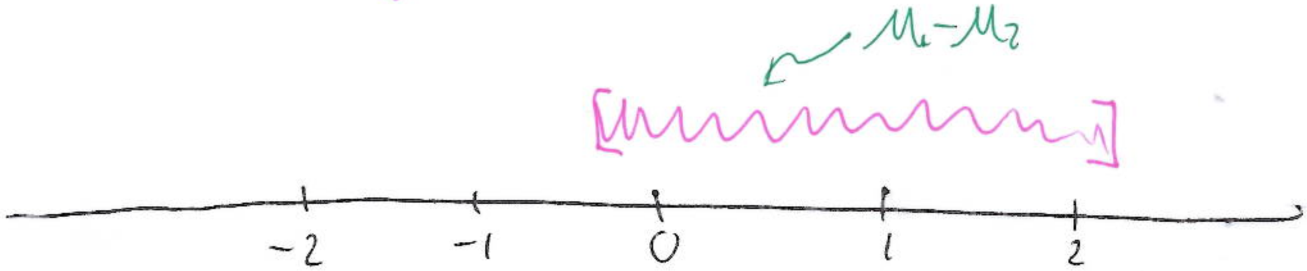
1 2

$$(\bar{x}_1 - \bar{x}_2) \pm t^* \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$$

$n_1 = 10$ $\bar{x}_1 = ?$ 6.04 $s_1 = ?$ 1.579 $t^* = ?$

$n_2 = 10$ $\bar{x}_2 = ?$ 5.05 $s_2 = ?$ 1.103

$(-.3009, 2.2809)$



μ_1 = true average aldrin at the bottom

μ_2 = true average aldrin at mid-depth