② Special Exercises	9	9.5	9.75	10	13	9.5
① Exercises control	11	10	10	11.75	10.5	15

μ_1 = true mean time for first steps if all babies were on the Exercises Control group

μ_2 = true mean time for first steps if all babies were on the Special Exercises Group

Find a 95% confidence interval for $\mu_1 - \mu_2$

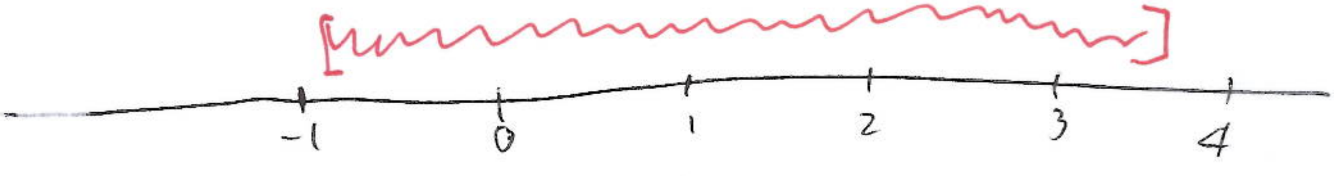
Conditions:

1:- Subjects were randomly assigned to their treatments

2:- The combined size $n = n_1 + n_2 = 6 + 6 = 12$ is not large enough, and both data sets have outliers so it is not clear that the results come from normally distributed populations.
(This property is not satisfied)

3:- $10n_1 = 60 <$ potential number of babies that could use the exercises
$10n_2 = 60 <$

95% conf. interval: $(-.94, 3.44)$



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 $\alpha =$ .10

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

$p_0 =$ ______ $\hat{p} =$ ______ $\overline{x} =$ ______

$\mu_0 =$ ______ $\hat{p}_1 =$ ______ $\overline{x}_1 =$ 6.04

$n =$ 20 $\hat{p}_2 =$ ______ $\overline{x}_2 =$ 5.05

Bottom → $n_1 =$ 10 $x_1 =$ ______ $s =$ ______

Mid-depth → $n_2 =$ 10 $x_2 =$ ______ $s_1 =$ 1.5791

$x =$ ______ $s_2 =$ 1.1037

Check the conditions:

1. The samples were randomly obtained and are independent of each other.
2. The combined size $n = n_1 + n_2 = 20$ is larger than 15, and the samples look normally distributed
3. $10n_1 = 100 <$ total number of measurements at the bottom.
$10n_2 = 100 <$ total number of measurements at mid-depth.

State the hypotheses:

H_0 : $\mu_1 = \mu_2$ or $\mu_1 - \mu_2 = 0$

H_a : $\mu_1 \neq \mu_2$ or $\mu_1 - \mu_2 \neq 0$

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

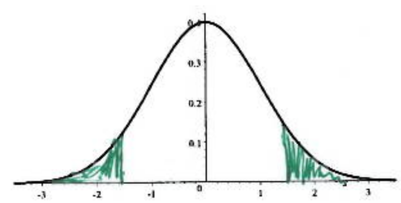
$\mu_1 =$ true mean amount of aldrin at the bottom of the Wolf River

$\mu_2 =$ true mean amount of aldrin at mid-depth of the Wolf River.

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

Test statistic: $\boxed{t = \dfrac{\bar{x}_1 - \bar{x}_2}{\sqrt{\dfrac{s_1^2}{n_1} + \dfrac{s_2^2}{n_2}}}}$ = 1.624892

formula



P-value = .123598

Is the sample significant? No

Yes/No

Conclusions:

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

Explain in context.

Because P-Value = .123598 > .10 = α, we don't reject the null hypotesis.

If the amount of contamination was the same for the bottom and mid-depth, then it would be likely (probability 12.35%) to get samples whose difference is as extreme or more than the ones we analyzed. So there is no evidence to believe that the amount of contamination is different.

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)

$p_0 =$ ____ $\hat{p} =$ ____ $\overline{x} =$ ____

$\mu_0 =$ ____ $\hat{p}_1 =$ ____ $\overline{x}_1 =$ 10.125

$n =$ ____ $\hat{p}_2 =$ ____ $\overline{x}_2 =$ 11.375

Special Exercises → $n_1 =$ 6 $x_1 =$ ____ $s =$ ____

Control Exercise → $n_2 =$ 6 $x_2 =$ ____ $s_1 =$ 1.4469

$x =$ ____ $s_2 =$ 1.89571

Check the conditions:

1. Babies were randomly assigned to their treatments
2. The data seems to have outliers and $n=12$ is not large enough. We'll proceed with extreme caution.
3. $10n_1 = 60 <$ total number of babies who could use the special exercises
$10n_2 = 60 <$ total number of babies who could use the control exercises

State the hypotheses:

H_0: $\mu_1 = \mu_2$ or $\mu_1 - \mu_2 = 0$

H_a: $\mu_1 < \mu_2$ or $\mu_1 - \mu_2 < 0$

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

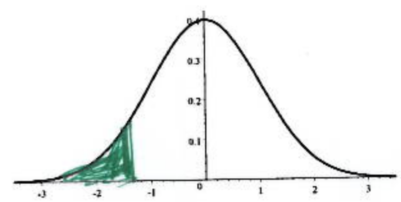
μ_1 = true mean amount of time for first steps with special Exercises

μ_2 = true mean amount of time for first steps in the control group

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

Test statistic: $\boxed{t = \dfrac{\bar{x}_1 - \bar{x}_2}{\sqrt{\dfrac{s_1^2}{n_1} + \dfrac{s_2^2}{n_2}}}}$ = -1.28388

formula



P-value = .115043

Is the sample significant? No

Yes/No

Conclusions:

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

Explain in context.

Because P-Value = .115043 > .05 = α, we don't reject the null hypotesis.

If both the special exercises and the control group provide the same mean time for first steps, then it would be likely (probability 11.5043%) to get results from 6 toddlers in each group whose average differences were as extreme or more than those in this experiment. So there is no evidence to believe that the special exercises help.

1:- One mean

$\mu_0 = 24,000$

Ha: $\mu \neq \mu_0$

2:- One proportion

$p_0 = .77$

Ha: $p > p_0$

3:- One mean

$\mu_0 = 42,000$

Ha: $\mu > \mu_0$

4:- Diff. of two proportions

Ha: $p_1 \neq p_2$

5:- Diff of two means

Ha: $\mu_1 \neq \mu_2$

6:- Diff of two mean

Ha: $\mu_1 \neq \mu_2$.

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 $\alpha =$ 0.05

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

$p_0 =$ ____ $\hat{p} =$ ____ $\overline{x} =$ ____

$\mu_0 =$ ____ $\hat{p}_1 =$ ____ $\overline{x}_1 =$ 191

$n =$ ____ $\hat{p}_2 =$ ____ $\overline{x}_2 =$ 199

Indiana $n_1 =$ 8 $x_1 =$ ____ $s =$ ____

Greene $n_2 =$ 10 $x_2 =$ ____ $s_1 =$ 38

$x =$ ____ $s_2 =$ 12

Check the conditions:

1. The samples were randomly obtained and independent of each other

2. $n = 18 > 15$.
and we assume the populations are normally distributed

3. $10n_1 = 80 <$ total # of farms in Indiana County
$10n_2 = 100 <$ total # of farms in Greene County.

State the hypotheses:

$H_0: \mu_1 = \mu_2$

$H_a: \mu_1 \neq \mu_2$

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

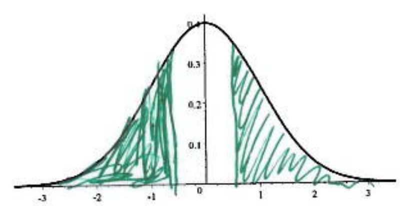
μ_1 = true average size of a farm in Indiana County

μ_2 = true average size of a farm in Greene County

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

Test statistic: $\boxed{t = \dfrac{\overline{x}_1 - \overline{x}_2}{\sqrt{\dfrac{s_1^2}{n_1} + \dfrac{s_2^2}{n_2}}}}$ = $-.5730$

formula



P-value = .5821

Is the sample significant? No
Yes/No

Conclusions:

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

Explain in context.

Because P-Value $= .5821 > .05 = \alpha$ we don't reject the null hypothesis.

If the average sizes of farms in these two counties were the same, then it would be very likely (probability 58.21%) to get samples with a difference as extreme or more than those we analyzed. So there is no evidence to beleive that the farm sizes are different.