KEY T-test Practice Problems

(1)

	Group 1	Group 2
$n=$	16	14
$\bar{x}=$	107	112
$s=$	4.5	3.5

a) $df = (16-1)+(14-1) =$
$15 + 13 = 28$

$df = 28$

b) table $t = 2.763$ ← Reminder: you look this up on p. 8 of stats. packet

c) $$t = \frac{107-112}{\sqrt{\frac{4.5^2}{16} + \frac{3.5^2}{14}}} = \frac{107-112}{\sqrt{\frac{20.25}{16} + \frac{12.25}{14}}}$$

$$t = \frac{107-112}{\sqrt{1.266 + 0.875}} = \frac{-5}{\sqrt{2.141}} = \frac{-5}{1.463}$$

calc $t = -3.418$

d) $-2.763 < -3.418 < +2.763$

Not true

↓

must reject the null

* There is a significant difference in IQ between the 2 groups of the city.

1) The I.Q. of 16 students from one area of a city showed a mean of 107 with a standard deviation of 4.5, while the I.Q.' s of 14 students from another area of the city showed a mean of 112 with a standard deviation of 3.5. Is there a significant difference between the I.Q.'s of the two groups at a .05 level of significance (or a 95% confidence level)? **Please show your work!**

2) At an agricultural station it was desired to test the effect of a given fertilizer on wheat production. To accomplish this, 24 plots of land having equal areas were chosen; half of these were treated with the fertilizer and the other half were untreated (control group). Otherwise the conditions were the same. The mean yield of wheat on the untreated plots was 4.8 bushels with a standard deviation of 1.2 bushels, while the mean yield on the treated plots was 5.1 bushels with a standard deviation of 0.6 bushels. Can we conclude that there is a significant improvement in wheat production because of the fertilizer at a confidence interval of 95%? **Please show your work!**

	Group 1	Group 2
=	12	12
$\bar{x}$ =	4.8	5.1
s =	1.2	0.6

a) $df = (12-1)+(12-1)$

$df = 22$

b) table $t = 2.819$

c) $$t = \frac{4.8-5.1}{\sqrt{\frac{1.2^2}{12}+\frac{0.6^2}{12}}} = \frac{4.8-5.1}{\sqrt{\frac{1.44}{12}+\frac{0.36}{12}}}$$

$$\frac{-0.3}{\sqrt{0.12+0.03}} = \frac{-0.3}{\sqrt{0.15}} = \frac{0.3}{0.387}$$

Calc $t = 0.775$

d) $-2.819 < 0.775 < +2.819$

TRUE!

↓

can't reject the null

* There is <u>Not</u> a significant difference between using and not using fertilizer.