A) Thirty sets of identical twins were enrolled in a study to measure the effect of home environment on certain social attitudes. One twin in each set was randomly assigned to a minority environment or a home environment. The twin assigned to the minority environment went to live with an African American family for a period of 1 year. At the end of the year, an attitudinal survey was administered. The data along with some descriptive statistics follow. Let alpha = 0.025 and test the hypothesis that living in the minority environment leads to higher scores on the attitudinal survey.

ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Home	65	67	75	77	69	65	73	78	70	72	73	79	68	73	71
Minor	83	75	72	76	78	80	72	81	70	78	77	71	87	70	75
Diff	18	8	-3	-1	9	15	-1	3	0	6	4	-8	19	-3	4
ID	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Home	68	73	72	67	75	78	74	75	66	72	72	78	69	66	73
Minor	75	79	79	69	73	77	77	81	74	83	74	72	78	78	77
Diff	7	6	7	2	-2	-1	3	6	8	11	2	-6	9	12	4
Note: Σ diff = 138, SS _{diff} = 1236.6, Diff = Minor - Home															

1) How can you tell that this is a paired experiment?

One clue that this is a Paired Experiment is that the investigator has used sets of twins. Typically, when this is done the analysis will be based on the differences between sets of scores rather than differences between the averages of one group versus the other.

- 2) Ho: μ_d <u><</u> 0 Ha: μ_d > 0
- 3) $\alpha = 0.025$ df = 29 t-crit = 2.045

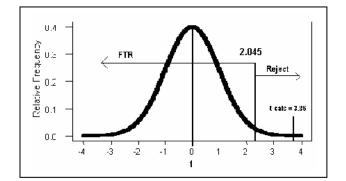
4) t-calc :

variance = s^2 = 1236.6/29 = 42.64 standard deviation = $\sqrt{42.64}$ = 6.53 SE mean = 6.53/ $\sqrt{30}$ = 1.19 $\overline{x} = \frac{138}{30} = 4.6$

t-calc = 4.6/1.19 = 3.86

- 5) The decision graphic is:
- 6) The statistical decision is:

Reject Ho



7) The English interpretation is:

At a significance level of 0.025 there is enough evidence to support the claim that living in a minority environment leads to higher scores on the attitudinal survey.

8) Construct a 99% CI for the true average difference in attitudinal scores achieved by subjects living in the two different environments.

 $\mu_{d} = \overline{d} \pm t \cdot SE$ = 4.6 ± 2.756 (1.19) = 4.6 ± 3.28 = (1.32, 7.88)

We are 99% confident that the true average "attitude" difference between living environments is between 1.32 and 7.88. At a significance level of 0.01 we can say that living in a minority environment is associated with higher scores.

