"FRAPPY"
{Free Response AP Problem...Yay!}

2006B Problem 4

The following problem is taken from an actual Advanced Placement Statistics Examination. Your task is to generate a complete, concise statistical response in 15 minutes. You will be graded based on the AP rubric and will earn a score of 0-4. After grading, keep this problem in your binder for your AP Exam preparation.

The developers of a training program designed to improve manual dexterity claim that people who complete the 6-week program will increase their manual dexterity. A random sample of 12 people enrolled in the training program was selected. A measure of each person's dexterity on a scale from 1 (lowest) to 9 (highest) was recorded just before the start of and just after the completion of the 6-week program. The data are shown in the table below.

Person	Before Program	After Program
A	6.7	7.8
B	5.4	5.9
C	7.0	7.6
D	6.6	6.6
E	6.9	7.6
F	7.2	7.7
G	5.5	6.0
H	7.1	7.0
I	7.9	7.8
J	5.9	6.4
K	8.4	8.7
L	6.5	6.5
Total	81.1	85.6

Scoring:

Can one conclude that the mean manual dexterity for people who have completed the 6-week training program has significantly increased? Support your conclusion with appropriate statistical evidence.

E   I

E   I

E   I

E   I

Total:___/4

2006B #4

① Let μ_d = mean difference ~~between~~ in manual dexterity (after - before)

Paired - t test

$H_0:$ ~~μ_d~~ $\mu_d = 0$

$H_A:$ $\mu_d > 0$

② Conditions:
- Random ✓
- Normal ✓

Problem states

A graph of sample data shows no oultiers or skewness

- Independent ✓

Assume there are at least 120 people and all observations independent

③ Calculations:

$t = 3.54$

pval $= 0.002$

$\alpha = 0.05$

④ since pval $< \alpha$, reject H_0

⑤ There is sufficient data to conclude that the mean manual dexterity for people who have completed the 6-week program has significantly increased.