

850
 EPRAY
 more examples of t-tests

**15.5 CAPTAIN BAKER'S
 PROBLEM: A TEST ABOUT μ**

Suppose that the Army has declared that a new standard will be placed into effect as of next July 1 recruits should, after six weeks of basic training, earn on the average a score of 30 on something called the Army Wind and Muscle Test. The base commander wants to know whether his present physical conditioning program appears to be adequate to meet this standard. He turns the problem over to his research officer, Capt Abel Baker, who will select a sample at random from among the large crop of soldiers just completing training and give them the new test. He does not really care about the mean of this particular sample, but he does want to know whether the mean of the population that has been sampled is 30. Therefore, he will hypothesize that the mean of the population is 30. If the mean of the recruit population differs from 30 in either direction, he would like to know it. Formally, his hypothesis will be expressed as follows:

$$H_0: \mu = 30$$

$$H_A: \mu \neq 30$$

Subject	Score X
A	43
B	28
C	24
D	37
E	36
F	31
G	30
H	39
I	44
J	39

**17.5 TESTING THE HYPOTHESIS
 OF NO DIFFERENCE BETWEEN
 TWO INDEPENDENT MEANS:
 THE VITAMIN A EXPERIMENT**

Does vitamin A make a difference in ability to see under conditions of dim illumination? We will test the hypothesis that:

$$H_0: \mu_X - \mu_Y = 0$$

$$H_A: \mu_X - \mu_Y \neq 0$$

using the 5% level of significance ($\alpha = .05$). Two samples of 10 cases each are selected at random from the target population.

Supplementary Vitamin A X	Normal Diet Y
38	37
41	34
42	45
47	40
42	43
45	40
48	42
31	22
38	28
30	31

**17.10 TESTING THE HYPOTHESIS
 OF NO DIFFERENCE BETWEEN
 TWO DEPENDENT MEANS**

Is reaction time different to a red light than to a green light? Suppose a group of subjects has been selected at random and given a preliminary test to determine the reaction time of each individual to a white-light stimulus. From among this group, pairs of subjects are formed such that the two members of any given pair are equal in speed of reaction to white light. Taking each pair in turn, one member is tested with a green light as the stimulus and the other with a red light. Which member of each pair receives which stimulus is determined at random. Reaction times are recorded in milliseconds. The two groups of subjects so selected constitute two dependent samples.

Pair	Reaction to green light stimulus X	Reaction to red light stimulus Y
1	28	25
2	26	27
3	33	28
4	30	31
5	32	29
6	30	30
7	31	32
8	18	21
9	22	25
10	24	20