

A.P. Statistics
Assignment 7.5

Remember to show your thinking through your work.

- 1) More than 200,000 people worldwide take the GMAT examination each year as they apply for MBA programs. Their scores vary normally with mean about $\mu = 525$ and standard deviation about $\sigma = 100$. One hundred students go through a rigorous training program designed to raise their GMAT scores. Test the hypotheses

$$H_0 : \mu = 525$$

$$H_a : \mu > 525$$

in each of the following situations:

- (a) The students' average score is $x = 541.4$. Is this result significant at the 5% level?

- (b) The average score is $x = 541.5$. Is this result significant at the 5% level?

- (c) What conclusions may you draw by comparing the answers to parts a and b?

- 2) A new supplier offers a good price on a catalyst used in your production process. You compare the purity of this catalyst with that from your current supplier. The P-value for a test of "no difference" is 0.15. Can you be confident that the purity of the new product is the same as the purity of the product that you have been using? Explain.

- 3) A randomized comparative experiment examined whether a calcium supplement in the diet reduces the blood pressure of healthy men. The subjects received either a calcium supplement or a placebo for 12 weeks. The statistical analysis was quite complex, but one conclusion was that "the calcium group had lower seated systolic blood pressure ($P = 0.008$) compared with the placebo group." Explain this conclusion, especially the P-value, as if you were speaking to a doctor who knows no statistics.

- 4) A social psychologist reports that "ethnocentrism was significantly higher ($P < 0.05$) among church attenders than among non-attenders." Explain what this means in language understandable to someone who knows no statistics. Do not use the word "significance" in your answer.

- 5) A study examined the effect of exercise on how students perform on their final exam in statistics. The P-value was given as 0.87.

(a) State null and alternative hypotheses that could have been used for this study.

(b) Do you reject the null hypothesis?

(c) What is your conclusion?

(d) What other facts about the study would you like to know for a proper interpretation of the results?