

Unit 7 Practice Test

Name _____

1. Suppose you were asked to analyze each of the situations described below. (NOTE: DO NOT DO THESE PROBLEMS!) For each, indicate which inference procedure you would use (from the list), the test statistic (z , t , or χ^2), and, if t or χ^2 , the number of degrees of freedom.

	Type	z , t , or χ^2	df
a.			
b.			
c.			
d.			
e.			
f.			
g.			
h.			

1. proportion, 1 sample
2. difference of proportions, 2 samples
3. mean, 1 sample
4. mean of differences, matched pairs
5. difference of means, independent samples
6. goodness of fit
7. homogeneity
8. independence
9. regression, inference for β

- a. A researcher wonders if meat in the diet may be a factor in high blood pressure. She compares the blood pressures of 40 randomly selected vegetarians, to those of 40 people who eat meat.
- b. According to the American Red Cross, 45% of Americans have Type O blood, 40% Type A, 11% Type B, and 4% Type AB. Last week a blood drive at the high school collected 132 pints of blood. If 51 were Type O, 55 Type A, 17 Type B, and 9 were Type AB, was this yield unusual in any way?
- c. Among a random sample of college-age drivers 5% of the 576 men said they had been ticketed for speeding during the past year, compared to only 3% of the 552 women. Does this indicate a significant difference between college males and females in terms of being ticketed for speeding?
- d. Who is paid more in New York State - teachers or policemen? We select a random sample of 25 New York cities and find the starting salaries of teachers and policemen in each.
- e. Researchers offer small cookies to nine nursery school children and record the number of cookies consumed by each. Forty-five minutes later they observe these children during recess, and rate each child for hyperactivity on a scale from 1 – 20. Is there any evidence that sugar contributes to hyperactivity in children?
- f. 22 people complaining of indigestion take an antacid. They report that their discomfort subsided in an average of 13 minutes; the standard deviation was 4 minutes. The manufacturer wants a 95% confidence interval for the “relief time”.
- g. A sports fan selected a random sample of 100 games from each of the NBA, the NFL, the NHL, and Major League Baseball to see if overtimes (or extra innings) are equally likely to occur in all four sports.
- h. A teacher believes that no more than 10% of high school students ever cheat on an exam, but a confidential survey found that 14 of 88 randomly selected students admitted having cheated at least once. Is this strong evidence that the teacher was wrong?

2. **Cloning** A random sample of 800 adults was asked the following question: "Do you think current laws concerning the use of cloning for medical research are too strict, too lenient, or about right?" The pollsters also classified the respondents with respect to highest education level attained: high school, 2-year college degree, 4-year degree, or advanced degree. We wish to know if attitudes on cloning are related to education level. (All the conditions are satisfied – don't worry about checking them.)

a. Write appropriate hypotheses.

	Strict	Lenient	Right	Total
High school	93 106.01	107 87.38	182 188.61	382
2-year	27 28.31	19 23.33	56 50.36	102
4-year	82 75.48	50 62.22	140 134.30	272
Adv. degree	20 12.21	7 10.07	17 21.73	44
Total	222	183	395	800
$\chi^2 =$	1.60 + 0.06 + 0.56 + 4.97 +	4.40 + 0.80 + 2.40 + 0.93 +	0.23 + 0.63 + 0.24 + 1.03 =	17.86
				P = 0.0066

b. Suppose the expected counts had not been given. Show how to calculate the expected count in the first cell (106.01).

c. How many degrees of freedom?

d. State your complete conclusion in context.

3. **Car reliability** A consumer group assigned 62 car models reliability ratings of 1 – 5 based upon repair records. They wondered if more expensive cars might be more reliable. To find out, they created the regression analysis shown. (SHOW WORK. Don't bother writing hypotheses, and you may assume the assumptions for inference were all satisfied.)

a. $df =$ _____

$t =$ _____

$P =$ _____

Variable	Coefficient	s.e. of coeff
Constant	2.7029	0.3508
Price	0.5099	0.4116

b. State your conclusion.

4. **College admissions** According to information from a college admissions office, 62% of the students there attended public high schools, 26% attended private high schools, 2% were home schooled, and the remaining students attended schools in other countries. Among this college's Honors Graduates last year there were 47 who came from public schools, 29 from private schools, 4 who had been home schooled, and 4 students from abroad. Is there any evidence that one type of high school might better equip students to attain high academic honors at this college? Test an appropriate hypothesis and state your conclusion.

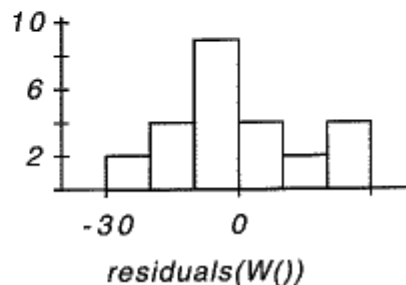
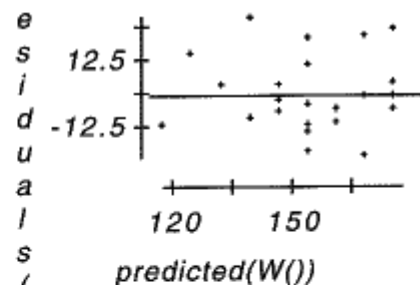
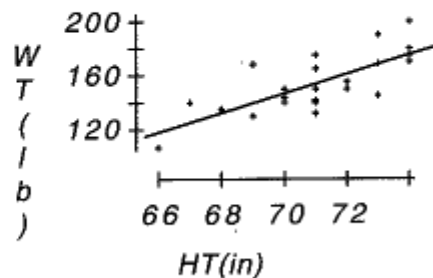
5. **Height and weight** Last fall, as our first example of correlation, we looked at the heights and weights of some AP Statistics students. Here are the scatterplot, the residuals plot, a histogram of the residuals, and the regression analysis for the data we collected from the males. Use this information to analyze the association between heights and weights of teenage boys.

Dependent variable is: WT(lb)

R squared = 56.6%

s = 14.16 with 25 - 2 = 23

Variable	Coefficient	s.e. of Coeff	t-ratio	prob
Const	-364.403	94.61	-3.85	0.0008
HT(in)	7.29993	1.333	5.48	≤ 0.0001



- a. Is there an association? Write appropriate hypotheses.

- b. Are the assumptions for regression satisfied? Explain.

- c. What do you conclude?

- d. Create a 95% confidence interval for the true slope.

- e. Explain in context what your interval means.

Unit 7 Practice Test additional parts to #5:

f) What is the r-squared value? Interpret the meaning of this value.

g) What is S_b ? Interpret the meaning of this value.

h) What is s ? Interpret the meaning of this value.