Midterm 2 Review Problems

1. The ages at death of 16 random married couples (husbands and wives) from England were obtained to determine if wives tend to outlive their husbands. These data should be analyzed with a:
    a. Two-sample t test for difference of means (equal variances)
    b. Two-sample t test for difference of means (unequal variances)
    c. Paired t test for mean difference
    d. Two-sample z test for difference of proportions
    e. Chi-square Test for Independence
    f. Chi-square Goodness-of-Fit Test

2. In a study concerning the health of bell pepper plants, water content of the soil in two fields is measured (in percent water by volume). In Field A, the mean water content at 14 random locations is found to be 12.5 with a sample standard deviation of 2.41. In Field B, the mean water content at 16 random locations is found to be 10.8 with a sample standard deviation of 2.38. Assuming the water content is normally distributed in each field, use a 5% significance level to test the claim that Field A has, on average, a higher soil water content than Field B.

3. Researchers conducted a study to determine if magnets are effective in treating back pain. Subjects were divided into two groups, one given a treatment with real magnets, the other with fake magnets (placebo). The proportions of patients who reported a decrease in pain level are provided below:

	Real Magnets	**Fake Magnets**
n	44	43
$\hat{p}_i$	.386	.233

Construct a confidence interval at the 95% level to estimate the difference in the proportion of patients reporting a decrease pain levels between the real and fake treatment groups.

4. An introductory level English Writing course was redesigned in the past year. Previously, the grade distribution for the course was as follows:

A	B	C	D	F	Withdraw
12%	26%	29%	11%	10%	12%

The most recent semester (after the redesign) showed the following number of students for each grade letter.

A	B	C	D	F	Withdraw
90	180	186	48	36	60

Is there evidence that the redesign changed the grade distribution for this course? Use $\alpha = 0.01$.