

Diets and Weight Loss

A study in The Journal of the American Medical Association describes the effects of diets on weight control. In the study, 311 women were randomly divided into four groups. The first group followed the Atkins diet, which is based on very low carbohydrate intake. The second group followed the LEARN (lifestyle, exercise, attitudes, relationships, nutrition) diet, which is based on low fat and high carbohydrate intake. The third group followed the Ornish diet, which is based on very high carbohydrate intake. The fourth group followed the Zone diet, which is based on low carbohydrate intake.

Each group received weekly instructions for two months, and there was a follow-up one year from the beginning of the study. The mean weight losses of each group after one year on the diet are shown in the table below.

	Atkins	LEARN	Ornish	Zone
	$n_1 = 77$	$n_2 = 79$	$n_3 = 76$	$n_4 = 79$
Weight Loss (in pounds)	$\bar{x} = 10.36$ $s_1 = 15.79$	$\bar{x} = 5.73$ $s_2 = 12.50$	$\bar{x} = 4.85$ $s_3 = 13.73$	$\bar{x} = 3.53$ $s_4 = 12.00$

Exercises:

In Exercises 1-4, perform a two-sample test to determine whether the mean weight losses of the two indicated groups are different. For each exercise:

- state your null and alternative hypotheses
- find the test statistic
- find the p-value
- write your conclusions as a sentence.

Use $\alpha = 0.05$.

- Test the weight losses of people in the Atkins group against those in the LEARN group.
- Test the weight losses of people in the Ornish group against those in the Zone group.
- Test the weight losses of people in the LEARN group against those in the Zone group.
- Test the weight losses of people in the Atkins group against those in the Ornish group.
- In which comparisons in Exercises 1-4 did you find a difference in weight losses? Write a summary of your findings.

(Note: Insert \rightarrow Equation to type in the formulas nicely.)