Shoppers eager to weigh benefits of buying in bulk

A new warehouse to compete with Sam's Club for customers. Iowa's first Costco warehouse club will open early next month at Jordan Creek Town Center in West Des Moines.

MARY CHIND/THE REGISTER

Iwa debut: Work continues as the opening date nears for Costco at Jordan Creek Town Center in West Des Moines.

Apples to apples, chardonnay to chardonnay

These comparisons are from the Costco and Sam's Club warehouses in Independence, Mo. Price checks were completed on Nov. 9.

GROCERIES	COSTCO	SAM'S CLUB
Roasted chicken, 3 pounds	$4.99	$4.88
Waterford Crystal flutes, pair	$65.99	$59.99
Absolut Vodka, 1.75 liters	$29.99	$29.39
Kendall Jackson Chardonnay, 750 ml.	$9.89	$9.78
Ground beef	$1.98/lb. (88% lean)	$1.95/lb. (90% lean)
Bath tissue, 36 rolls	$14.49 (425 sheets)	$14.88 (400 sheets)
Gatorade	$11.79 (12 32-oz. bottles)	$13.42 (24 20-oz. bottles)
Two dozen roses, fresh cut	$12.99	$12.73
Hot dog and soda	$1.50	$1.50
Cooked pizza	$9.95	$7.97

Source: Des Moines Register, Nov 15, 2004.

$\bar{d} = 0.707 \qquad s_d = 2.06$

We're going to compare the prices between Costco and Sams Club. Why would this be considered as a paired sample problem?
Each product is measured twice.
Calculate the differences between prices for each product, and the sample average difference and sample standard deviation of the differences.

Product	Costco	Sams	Diff
Chicken	4.99	4.88	0.11
Crystal	65.99	59.99	6.00
Vodka	29.99	29.39	0.60
Chardonnay	9.89	9.78	0.11
Beef	1.98	1.95	0.03
Tissue	14.49	14.88	-0.39
Gatorade	11.79	13.42	-1.63
Roses	12.99	12.73	0.26
Hot dog/soda	1.50	1.50	0
Pizza	9.95	7.97	1.98

Compute a 95% confidence interval for the mean difference in price.

$$0.707 \pm 2.262 \frac{2.06}{\sqrt{10}} = (-0.77, 2.18)$$

If we were to test the hypothesis $H_o : \delta = 0$ vs $H_A : \delta \neq 0$ using the confidence interval, what would your conclusion be? *The null value, 0, is inside the interval, so we would not reject the null hypothesis. The conclusion would be that there is no significant difference between prices at Costco and Sams Club.*
What would be the significance of the test be? $\alpha = 0.05$ *because the confidence level is 95% (0.95).*
What assumption is probably not satisfied, and how does this affect your conclusion?
Random sample: *The products are probably not randomly sampled, more likely hand-picked by the reporter.* **Dependent pairs:** *Clearly this is ok.* **Normal population of the differences:** *The differences for all the products most likely has a skewed distribution, a lot more products with small prices, and thus small differences between the two stores.*