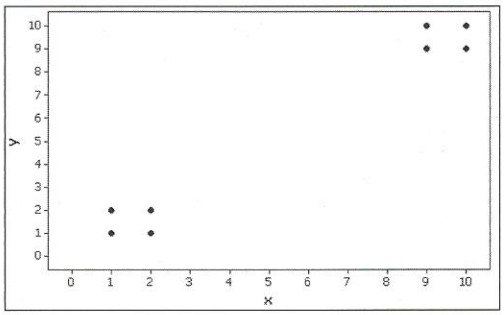
Linear Correlation (Section 10-2)

TABLE A-5 Critical Values of the Pearson Correlation Coefficient r

n	$\alpha = .05$	$\alpha = .01$
4	.950	.990
5	.878	.959
6	.811	.917
7	.754	.875
8	.707	.834
9	.666	.798
10	.632	.765
11	.602	.735
12	.576	.708
13	.553	.684
14	.532	.661
15	.514	.641
16	.497	.623
17	.482	.606
18	.468	.590
19	.456	.575
20	.444	.561
25	.396	.505
30	.361	.463
35	.335	.430
40	.312	.402
45	.294	.378
50	.279	.361
60	.254	.330
70	.236	.305
80	.220	.286
90	.207	.269
100	.196	.256

NOTE: To test H_0: $\rho = 0$ against H_1: $\rho \neq 0$, reject H_0 if the absolute value of r is greater than the critical value in the table.

MINITAB



d. Find the value of the linear correlation coefficient using all eight points. What does that value suggest about the relationship between x and y?

e. Based on the preceding results, what do you conclude? Should the data from women and the data from men be considered together, or do they appear to represent two different and distinct populations that should be analyzed separately?

Testing for a Linear Correlation. ***In Exercises 13–28, construct a scatterplot, find the value of the linear correlation coefficient r, and find the critical values of r from Table A-5 using $\alpha = 0.05$. Determine whether there is sufficient evidence to support a claim of a linear correlation between the two variables. (Save your work because the same data sets will be used in Section 10-3 exercises.)***

13. CPI and Pizza The paired values of the Consumer Price Index (CPI) and the cost of a slice of pizza from Table 10-1 in the Chapter Problem are listed below. Is there a linear correlation between the CPI and the cost of a slice of pizza?

CPI	30.2	48.3	112.3	162.2	191.9	197.8
Cost of Pizza	0.15	0.35	1.00	1.25	1.75	2.00

14. CPI and Subway Fare The paired values of the Consumer Price Index (CPI) and the cost of subway fare from Table 10-1 in the Chapter Problem are listed below. Is there a linear correlation between the CPI and subway fare?

CPI	30.2	48.3	112.3	162.2	191.9	197.8
Subway Fare	0.15	0.35	1.00	1.35	1.50	2.00

15. Blood Pressure Measurements Listed below are systolic blood pressure measurements (in mm Hg) obtained from the same woman (based on data from "Consistency of Blood Pressure Differences Between the Left and Right Arms," by Eguchi, et al., *Archives of Internal Medicine,* Vol. 167). Is there sufficient evidence to conclude that there is a linear correlation between right and left arm systolic blood pressure measurements?

Right Arm	102	101	94	79	79
Left Arm	175	169	182	146	144

16. Heights of Presidents and Runners-Up Theories have been developed about the heights of winning candidates for the U.S. presidency and the heights of candidates who were runners-up. Listed below are heights (in inches) from recent presidential elections. Is there a linear correlation between the heights of candidates who won and the heights of the candidates who were runners-up?

Winner	69.5	73	73	74	74.5	74.5	71	71
Runner-Up	72	69.5	70	68	74	74	73	76

17. Measuring Seals from Photos Listed below are the overhead widths (in cm) of seals measured from photographs and the weights (in kg) of the seals (based on "Mass Estimation of Weddell Seals Using Techniques of Photogrammetry," by R. Garrott of Montana State