

**Directions – Using your calculator, find the linear regression equation (don't round), the correlation coefficient  $r$  (don't round), and answer the questions for that problem.**

- 1.) The table below shows the number of years coaching and the number of wins at the end of the 1999 season for selected professional football coaches.

$L_1(x)$        $L_2(y)$

NFL Coach	Years	Wins
D. Shula	33	347
G. Halas	40	324
T. Landry	29	270
C. Lambeau	33	229
C. Noll	23	209
C. Knox	22	193
D. Reeves	19	177
P. Brown	21	170
B. Grant	18	168
S. Owen	23	153

- a.) What is the linear regression equation?

$$y = 8.134344072x + 11.69361971$$

- b.) What is the correlation coefficient to the data?

$$r = .8674686298$$

- c.) Marv Levy was coaching for 17 years at the end of the 1999 season. Using the regression equation, how many wins would he predicted to have?  $x = 17$

about 150 wins  $y = ?$

- d.) If NFL coach had 231 wins after the 1999 season, how many years would he have been coaching?  $x = ?$

27 years  $y = 231$

- 2.) Acorns were one of the most important foods of the Native Americans. They pulverized the acorns, extracted the bitter taste, and then cooked them in various ways. The table shows the size of the acorns (volume in cubic centimeters) and the geographical area (100 square kilometers) covered by different species of oak that produce acorns.

$L_1(x)$        $L_2(y)$

Acorn Size	0.3	0.9	1.1	2.0	3.4	4.8	8.1	10.5
Area Range	233	7985	10161	17042	19045	20178	28389	32564

- a.) What is the linear regression equation?

$$y = 2705.84138x + 6430.666636$$

- b.) What is the correlation coefficient to the data?

$$r = .938423077$$

- c.) What is the size of the acorns if the geographical area range is 38,360?

$$11.8 \text{ cm}^3$$

- d.) What is the geographical area range of acorns that are 2.6 cubic centimeters?

$$13,466 \text{ km}^2$$

- 3.) Women have changed their role in America society in recent decades. The table below shows the percent of working women who hold managerial or professional jobs.

$L_1(x)$        $L_2(y)$

Year	1986	1988	1990	1992	1993	1994	1995	1996	1997
Percent (as a decimal)	.237	.252	.262	.274	.283	.287	.294	.303	.308

- a.) What is the linear regression equation?

$$y = .006396969x - 12.46711818$$

- b.) What is the correlation coefficient to the data?

$$r = .9984240669$$

- c.) What percent of women working professional jobs be in 2008?

$$37.8\%$$

- d.) In what year will 44.8% women be working professional jobs?

$$\text{around } 2019$$

$$x = ? \quad y = .448 \text{ (zoom out twice)}$$