

5.

One may wonder if people of similar heights tend to marry each other. For this purpose, a sample of newly married couples was selected. Let  $X$  be the height of the husband and  $Y$  be the height of the wife. The heights (in centimeters) of husbands and wives are found in Table 2.11. The data can also be found at the book's Website.

- (a) Compute the covariance between the heights of the husbands and wives.
- (b) What would the covariance be if heights were measured in inches rather than in centimeters?
- (c) Compute the correlation coefficient between the heights of the husband and wife.
- (d) What would the correlation be if heights were measured in inches rather than in centimeters?
- (e) What would the correlation be if every man married a woman exactly 5 centimeters shorter than him?
- (f) We wish to fit a regression model relating the heights of husbands and wives. Which one of the two variables would you choose as the response variable? Justify your answer.
- (g) Using your choice of the response variable in Exercise 2.10(f), test the null hypothesis that the slope is zero.
- (h) Using your choice of the response variable in 2.10(f), test the null hypothesis that the intercept is zero.

**Table 2.11** Heights of Husband ( $H$ ) and Wife ( $W$ ) in (Centimeters)

Row	$H$	$W$	Row	$H$	$W$	Row	$H$	$W$
1	186	175	33	180	166	65	181	175
2	180	168	34	188	181	66	170	169
3	160	154	35	153	148	67	161	149
4	186	166	36	179	169	68	188	176
5	163	162	37	175	170	69	181	165
6	172	152	38	165	157	70	156	143
7	192	179	39	156	162	71	161	158
8	170	163	40	185	174	72	152	141
9	174	172	41	172	168	73	179	160
10	191	170	42	166	162	74	170	149
11	182	170	43	179	159	75	170	160
12	178	147	44	181	155	76	165	148
13	181	165	45	176	171	77	165	154
14	168	162	46	170	159	78	169	171
15	162	154	47	165	164	79	171	165
16	188	166	48	183	175	80	192	175
17	168	167	49	162	156	81	176	161
18	183	174	50	192	180	82	168	162
19	188	173	51	185	167	83	169	162
20	166	164	52	163	157	84	184	176
21	180	163	53	185	167	85	171	160
22	176	163	54	170	157	86	161	158
23	185	171	55	176	168	87	185	175
24	169	161	56	176	167	88	184	174
25	182	167	57	160	145	89	179	168
26	162	160	58	167	156	90	184	177
27	169	165	59	157	153	91	175	158
28	176	167	60	180	162	92	173	161
29	180	175	61	172	156	93	164	146
30	157	157	62	184	174	94	181	168
31	170	172	63	185	160	95	187	178
32	186	181	64	165	152	96	181	170