

5.22 In Exercise 5.4, you were given the following joint probability function for

$$Y_1 = \begin{cases} 0, & \text{if child survived,} \\ 1, & \text{if not,} \end{cases} \quad \text{and} \quad Y_2 = \begin{cases} 0, & \text{if no belt used,} \\ 1, & \text{if adult belt used,} \\ 2, & \text{if car-seat belt used.} \end{cases}$$

y_2	y_1		Total
	0	1	
0	.38	.17	.55
1	.14	.02	.16
2	.24	.05	.29
Total	.76	.24	1.00

- Give the marginal probability functions for Y_1 and Y_2 .
- Give the conditional probability function for Y_2 given $Y_1 = 0$.
- What is the probability that a child survived given that he or she was in a car-seat belt?

- 5.32** Suppose that the random variables Y_1 and Y_2 have joint probability density function, $f(y_1, y_2)$, given by (see Exercise 5.14)

$$f(y_1, y_2) = \begin{cases} 6y_1^2 y_2, & 0 \leq y_1 \leq y_2, y_1 + y_2 \leq 2, \\ 0, & \text{elsewhere.} \end{cases}$$

- a** Show that the marginal density of Y_1 is a beta density with $\alpha = 3$ and $\beta = 2$.
- b** Derive the marginal density of Y_2 .
- c** Derive the conditional density of Y_2 given $Y_1 = y_1$.
- d** Find $P(Y_2 < 1.1 | Y_1 = .60)$.