

## 6.40 (page.304) – Characteristics of buyers of Hybrid Honda Civic

	Hybrid	Not Hybrid	Total
Male	77	117	194
Female	34	83	117
Total	111	200	311

Convert to joint probability

	Hybrid	Not Hybrid	Total
Male	0.25	0.38	0.62
Female	0.11	0.27	0.38
Total	0.36	0.64	1

a. and b.

i.  $P(\text{male}) = 0.62.$

If a person who purchased a Honda Civic is chosen at random, the probability that this person is a male is 0.62.

ii.  $P(\text{hybrid}) = 0.36.$

If a person who purchased a Honda Civic is chosen at random, the probability that this person purchased a hybrid is 0.36.

iii.  $P(\text{hybrid}|\text{male}) = \frac{P(\text{male} \cap \text{hybrid})}{P(\text{male})} = \frac{0.25}{0.62} = 0.4 .$

If a male who purchased a Honda Civic is chosen at random, the probability that he purchased a hybrid is 0.4.

iv.  $P(\text{hybrid}|\text{female}) = \frac{P(\text{female} \cap \text{hybrid})}{P(\text{female})} = \frac{0.11}{0.38} = 0.29$

If a female who purchased a Honda Civic is chosen at random, the probability that she purchased a hybrid is 0.3.

v.  $P(\text{female}|\text{hybrid}) = \frac{P(\text{female} \cap \text{hybrid})}{P(\text{hybrid})} = \frac{0.11}{0.36} = 0.31$

If a person who purchased a hybrid Honda Civic is chosen at random, the probability that this person is female is 0.31.

## 6.52 (page.306) – Treatments

	Survived (S)	Died (D)	Total
Treatment A (A)	95	5	100
Treatment B (B)	221	39	260
Total	316	144	360

Convert to joint probability

	Survived (S)	Died (D)	Total
Treatment A (A)	0.26	0.01	0.28
Treatment B (B)	0.61	0.11	0.72
Total	0.88	0.12	1

c.

i.  $P(S) = 0.88$

ii.  $P(S|A) = \frac{P(S \cap A)}{P(A)} = \frac{0.26}{0.28} = 0.93$

iii.  $P(S|B) = \frac{P(S \cap B)}{P(B)} = \frac{0.61}{0.72} = 0.85$

iv. Treatment A appears to be better, since the probability of survival given that the patient receives treatment A is greater than the probability of survival given that the patient receives treatment B.

## 6.55 (page.313) – Complementary Therapies and Conventional Medications

	NCT	CT	Total
CH	816	131	947
CNH	103	27	130
Total	919	158	1077

a. Convert to joint probability

	NCT	CT	Total
CH	0.76	0.12	0.88
CNH	0.10	0.03	0.12
Total	0.85	0.15	1

b.

0.12 represents the probability of conventional medications usually help and does use the complementary therapies.

0.10 represents the probability of conventional medications usually do not help and does not use the complementary therapies.

0.03 represents the probability of conventional medications usually do not help and does use the complementary therapies.

c.

$$P(\text{CH} \mid \text{CT}) = \frac{P(\text{CH} \cap \text{CT})}{P(\text{CT})} = \frac{0.12}{0.15} = 0.83 ; P(\text{CH}) = 0.88$$

Due to  $P(\text{CH} \mid \text{CT}) \neq P(\text{CH})$ , the events are not independent.

### **6.56 (page. 313) – Centers for Disease Control and Prevention**

$$P(\text{F} \mid \text{L}) = \frac{P(\text{F} \cap \text{L})}{P(\text{L})} = \frac{0.31}{0.58} = 0.534 ; P(\text{F}) = 0.5$$

Due to  $P(\text{F} \mid \text{L}) \neq P(\text{F})$ , the events are not independent.