Name:
Date:

PBHL 5013/BIOM 5013 – Collected Homework
Chapter 4

1. Answer to 4.9.

Judged to Need eyeglasses	Used Eyeglasses for Reading Yes	No
Yes	.44	.14
No	.02	.40

Find the probability of each event:

a. The adult is judged to need eyeglasses 0.58

b. The adult needs eyeglasses for reading but does not use them. 0.14

c. The adult uses eyeglasses for reading whether he or she needs them or not. 0.46

2. Answer to 4.15.

Eye Color	Wing Size Normal	Miniature	
Normal	140	6	146
Vermillion	3	151	154
	143	157	300

a. What is the probability that the fly has normal eye color and normal wing size? $140/300 \cong 0.467$

b. What is the probability that the fly has vermillion eyes? $154/300 \cong 0.513$

c. What is the probability that the fly has either vermillion eyes or miniature wings, or both? $160/300 \cong 0.533$

3. Answer to 4.47.

Find the probabilities associated with the events below using either the simple event approach or the rules and definitions from this section.

$A = \{1, 2, 3\}$, $B = \{1, 2\}$, $C = \{4, 5, 6\}$

a. S 1
b. $A|B$ 1
c. B $2/6 = 1/3$
d. $A \cap B \cap C$ 0
e. $A \cap B$ $2/6 = 1/3$
f. $A \cap C$ 0
g. $B \cap C$ 0
h. $A \cup C$ $4/6 = 1$
i. $B \cup C$ $5/6$

4. Answer to 4.49.

If events A and B are independent, find these probabilities:

$P(A) = 0.4$, $P(B) = 0.2$

a. $P(A|B)$ 0.4
b. $P(A \cup B)$ 0.52

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$
$$= P(A) + P(B) - P(A)P(B)$$
$$= 0.4 + 0.2 - (0.4)(0.2)$$
$$= 0.52$$

5. Answer to 4.51. $P(A) = 0.4$, $P(A \cap B) = 0.12$

a. Find $P(B|A)$. 0.3

$$P(B|A) = \frac{P(B \cap A)}{P(A)} = \frac{P(A \cap B)}{P(A)} = \frac{0.12}{0.4} = 0.3$$

b. Are events A and B mutually exclusive? No $\quad P(A \cap B) \neq 0$

c. If $P(B) = .3$ are events A and B independent? Yes $\quad P(B|A) = P(B)$

6. Answer to 4.64.

a. What is the probability that an offspring in this mating has at least one dominant allele? 3/4

b. What is the probability that an offspring has at least one recessive allele? 3/4

c. What is the probability that an offspring has one recessive allele, given that the offspring has red flowers? 2/3