1.a.
Population: the households in 2008 in America

Sample: the 1500 people surveyed in 2008

Population parameter of interest: the average money spent on Halloween in 2008 within American families

Sample statistics: the average $58 found in the sample

1.b.
Population: the students in this university in 2011

Sample: the 203 students being surveyed in this university in 2011

Population parameter of interest: the average GPA that students got in this university in 2011

Sample statistics: the average 3.59 GPA in the sample

2.a.
Sample space S = {(1,1), (1,2), (1,3), (1,4), (1,5), (1,6), (2,1), …, (6,6)}

Event E means the combination of the number of two dices which have an odd sum, such as (1,1) or (3,5). It has exactly 6*6/2 = 18 combinations.

Event F means the combination that the first number in the bracket is 1, which are from (1,1) to (1,6), which have 6 possibilities.

2.b.
$E \cap F$: 3
$E \cup F$: 18+6-3 = 21
$E \cap F^c$: 18-3 = 15

3.a.
Possibility = 5/15 = 1/3

3.b.
Same as question a. It's 1/3

3.c.
1/15

4.a.
Probability: (212+36)/ (212+36+198+54) = 0.496

4.b.
54/ (54+198) = 3/14

5.a.
0.9*0.15 + 0.1*0.8 = 0.215
1 - 0.215 = 0.785

5.b.
Probability if it's dead: 0.215
Forget to wash it that cause its death: 0.1*0.8 = 0.08

Probability = 0.08/0.215 which is approximately 0.372

6 and 7

6.a. we can get that

$P(L|C^c) = 0.135$

$P(L|C) = 0.268$ ⇒ when C is got cancer, C^c is not got cancer, L is PSA level high

$P(C) = 0.7$

$P(C^c) = 0.3$

so. ask $P(C|L) = \frac{P(L \wedge C)}{P(L)}$

$= \frac{P(L|C)P(C)}{P(L|C)P(C) + P(L|C^c)P(C^c)}$

$= \frac{0.268 \times 0.7}{0.268 \times 0.7 + 0.135 \times 0.3}$

$= \frac{0.1876}{0.2281}$

≈ 0.822

6.b.

ask for $P(C|L^c)$

we know that $P(L^c|C^c) = 1 - 0.135 = 0.865$

$P(L^c|C) = 1 - 0.268 = 0.732$

so $P(C|L^c) = \frac{P(L^c \wedge C)}{P(L^c)}$

$= \frac{P(L^c|C)P(C)}{P(L^c|C)P(C) + P(L^c|C)P(C^c)}$

$= \frac{0.5124}{0.7719}$

≈ 0.664

7.a. $\frac{1}{2} \times 1 \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}$

7.b. $\frac{1}{2} \times 1 \times \frac{1}{2} \times 1 \times \frac{1}{2} = \frac{1}{8}$

7.c. $\frac{1}{8} + \frac{1}{8} = \frac{1}{4}$

7.d. $1 - \frac{1}{4} = \frac{3}{4}$