Chapter 6 Review 2 in class (6.6)

1) If A and B are two events in an experiment where P(A) = 0.8 and $P(A \cap B) = 0.3$ find $P(B \mid A)$.

$$\frac{P(A \cap B)}{P(A)} = \frac{0.3}{0.8} = \boxed{0.375}$$

$6 \times 6 = 36$

1) A pair of fair 6-sided dice is tossed. Let A = {the sum is 8} and B= {1st die is a 4}.

a) Find $P(B \mid A)$

$$\frac{P(B \cap A)}{P(A)} = \frac{\frac{1}{36} \cdot \frac{36}{5}}{\frac{5}{36}} = \boxed{\frac{1}{5}}$$

b) Find $P(A \mid B)$

$$\frac{P(A \cap B)}{P(B)} = \frac{\frac{1}{36} \cdot \frac{36}{6}}{\frac{6}{36}} = \boxed{\frac{1}{6}}$$

A	B
(2,6)	(4,1)
(3,5)	(4,2)
(4,4)	(4,3)
(5,3)	(4,4)
(6,2)	(4,5)
	(4,6)

2) Suppose all patients are tested for a serious disease that is estimated to be found in 0.5% of people. Suppose also that the test accurately spots the disease 98% of the time and accurately indicates no disease 95% of the time.

a) Make a contingency table for this situation:

	Disease 0.5%	No Disease 99.5%
Positive Test	98%	5%
Negative Test	2%	95%
Total	100%	100%

b) What is the probability that someone who tests positive does not have the disease?

$$\frac{P(+ \text{ and not disease})}{P(+)} = \frac{(0.05)(.995)}{(0.005)(0.98) + (.05)(.995)}$$

$$= \frac{0.04975}{0.05465} = \boxed{0.91 = 91\%}$$