1) Suppose that $P(A) = 0.8$, $P(B) = 0.5$, $P(A \cup B) = 0.9$.

a) Are $A$ and $B$ independent events?

b) Find the conditional probability that $A$ occurs given that $B$ occurs.

c) Find the conditional probability that $B$ occurs given that $A$ does not occur.
2) Compute the mean and the standard deviation of the discrete random variable with the following probability distribution

\[
\begin{array}{c|c|c|c}
   x & 1 & 2 & 3 \\
   \hline
   f(x) & 0.5 & 0.2 & 0.3 \\
\end{array}
\]
3) The probability of a patient recovering from a certain disease is 0.6. Use the attached binomial probabilities table to determine the probability that out of 20 such patients, at least 10 will recover.

4) The weights of a certain brand of apples are normally distributed with mean 5.2 ounces and standard deviation 0.8 ounce. What percentage of the apples weigh between 5 and 6 ounces?
5) The probability of a patient recovering from a certain disease is 0.6. What is the probability that out of 50 such patients, between 30 and 37 (inclusive) will recover.

6) The weights of a certain brand of apples are normally distributed with mean 5.7 ounces and standard deviation 0.7 ounce. An apple is said to be large if its weight is in the top 30 percent. Find the cutoff size for the large apples.
7) Two dice are tossed and $X$ denotes the number of 5’s that come up. What is the probability distribution of $X$?
Answer all the questions and justify your answers.

1) Compute the mean and the standard deviation of the discrete random variable with the following probability distribution

\[
\begin{array}{c|c|c|c}
 x & 1 & 2 & 3 \\
 f(x) & 0.3 & 0.2 & 0.5 \\
\end{array}
\]
2) The probability of a patient recovering from a certain disease is 0.5. Use the attached binomial probabilities table to determine the probability that out of 20 such patients, at least 8 will recover?

3) The weights of a certain brand of apples are normally distributed with mean 5.5 ounces and standard deviation 0.7 ounce. What percentage of the apples weigh between 5 and 6 ounces?
4) The probability of a patient recovering from a certain disease is 0.8. What is the probability that out of 50 such patients, between 40 and 45 (inclusive) will recover.

5) The weights of a certain brand of apples are normally distributed with mean 4.7 ounces and standard deviation 0.7 ounce. An apple is said to be large if its weight is in the top 25 percent. Find the cutoff size for the large apples.
6) Two dice are tossed and $X$ denotes the number of 4’s that come up. What is the probability distribution of $X$?
7) Suppose that $P(A) = 0.7$, $P(5) = 0.5$, $P(A \cup B) = 0.9$.

a) Are $A$ and $B$ independent events?

b) Find the conditional probability that $B$ occurs given that $A$ occurs.

c) Find the conditional probability that $A$ occurs given that $B$ does not occur.