1. For the probability function

x	1	2	3	4	5
$p(x)$	0.15	0.25	0.3	0.2	0.1

   (a) compute the mean

   (b) item compute the variance

   (c) plot the distribution in R

2. For the probability distribution in Exercise 1,

   (a) what is the probability of observing a value less than or equal to 2?

   (b) what is the probability of observing a value greater than 3?

   (c) what is the probability of observing a value within one standard deviation of the mean?

3. For a binomial with $N = 15$ and $\theta = 0.6$, what is the probability of observing exactly 2 successes?

4. A coin is rigged so that when it is flipped, the probability of observing "heads" is 0.7. If the coin is flipped three times, which is the more likely outcome: exactly three heads, or two heads and a tail?

5. The Department of Agriculture reports that 75% of all people who invest in the futures market lose money. Suppose you are friends with 5 futures traders, each of whom invests independently of the other. Use a binomial distribution to compute the probability that:

   (a) all five lose money

   (b) all five make money

   (c) at least two lose money

6. Suppose that for a thesis, a colleague has planned 4 independent replications of a basic finding, but has done so quite badly, because their small samples only guarantee power of 30%. When your colleague reports the results of their thesis, he reports a statistically significant effect in each of the 4 replications. A faculty member suggests that it is very likely that your colleague has committed scientific misconduct. Why?

7. If X is normally distributed with mean $\mu = 20$ and standard deviation $\sigma = 9$, determine:

   (a) $P(X < 22)$

   (b) $P(X > 17)$

   (c) $P(2 < X < 38)$

8. Assuming that the scores on a math achievement test are normally distributed with mean $\mu = 68$ and standard deviation $\sigma = 10$:

   (a) what is the probability of getting a score greater than 78?

   (b) how high must someone score to be in the top 10%?

9. Suppose the winnings of gamblers in Las Vegas are normally distributed with mean $\mu = -300$ (the typical person loses \$300), and standard deviation $\sigma = 100$. Determine the probability that a gambler does NOT lose any money.

10. If X is normally distributed with mean $\mu = 100$ and standard deviation $\sigma = 15$, determine c so that

$$P(\mu - c\sigma < X < \mu + c\sigma) = 0.8$$