Chapter 6 -- Practice Problems

1. The starting salaries of individuals with a MBA degree are normally distributed with a mean of $40,000 and a standard deviation of $5,000. What is the probability that a randomly selected individual with a MBA degree will get a starting salary of at least $30,000?
ANSWER: There is a 97.72% chance that a randomly selected individual with an MBA degree will have a starting salary of at least $30,000.

2. The starting salaries of individuals with a MBA degree are normally distributed with a mean of $40,000 and a standard deviation of $5,000. What is the probability that a randomly selected individual with a MBA degree will get a starting salary of at least $47,500?
ANSWER: There is a 6.68% chance that a randomly selected individual with an MBA degree will have a starting salary of at least $47,500.

3. The starting salaries of individuals with a MBA degree are normally distributed with a mean of $40,000 and a standard deviation of $5,000. What percentage of MBA's will have starting salaries of $34,000 to $46,000?
ANSWER: There is a 76.98% chance that a randomly selected individual with an MBA degree will have a starting salary between $34,000 and $46,000..

4. Scores on a recent national statistics exam were normally distributed with a mean of 80 and a standard deviation of 6.

   a. What is the probability that a randomly selected exam will have a score of at least 71?
   ANSWER: There is a 93.32% chance that a randomly selected exam will have a score of at least 71.

   b. What percentage of exams will have scores between 89 and 92?
   ANSWER: There is a 4.40% chance that a randomly selected exam will have a score between 89 and 92.

   c. If the top 2.5% of test scores receive merit awards, what is the lowest score eligible for an award?
   ANSWER: The lowest score on the exam should be at least 91.76 to be classified in the top 2.5% of the exam scores.

5. The average starting salary of this year's MBA students is $35,000 with a standard deviation of $5,000. Furthermore, it is known that the starting salaries are normally distributed. Fifty-eight percent of the MBA students will earn at least what salary?
ANSWER: Fifty-eight percent of the MBA students will earn at least a $34,000 staring salary.

6. The long-distance calls made by the employees of a company are normally distributed with a mean of 6.3 minutes and a standard deviation of 2.2 minutes. Find the probability that a call

A.) Lasts between 5 and 10 minutes
ANSWER: There is a 67.59% chance that a call will last between 5 and 10 minutes.

B.) Lasts more than 7 minutes
ANSWER: There is a 37.45% chance that a call will last more than 7 minutes.

C.) Less than 4 minutes
ANSWER: There is a 14.69% chance that a call will last less than 4 minutes.

7. The number of pages printed before replacing the cartridge in a laser printer is normally distributed with a mean of 11,500 pages and a standard deviation of 800 pages. A new cartridge has just been installed.

A.) What is the probability that the printer produces more than 12,000 pages before this cartridge needs to be replaced?
ANSWER: There is a 26.43% chance that the printer will produce 12,000 pages or more before the cartridge needs to be replaced.

B.) What is the probability that the printer produces fewer than 10,000 pages?
ANSWER: There is a 3.01% chance that the printer will produce fewer than 10,000 pages before the cartridge needs to be replaced.

8. The demand for a daily newspaper at a newsstand at a busy location is known to be normally distributed with a mean of 150 and a standard deviation of 25. How many newspapers should the newsstand operator order to ensure that he runs short no more than 20% of the days.
ANSWER: The operator should order 171 papers to ensure that he runs short no more than 20% of the days.

9. A famous donut chain that is currently under investigation by the SEC prepares its famous glazed donuts fresh every day. A statistically savvy customer (you) determined that the daily demand is normally distributed with a mean of 1850 and a standard deviation of 175. How many glazed donuts should the donut store make if it wants the probability of running short on any day to be no more than 22%?
ANSWER: The store should produce at least 1984.75 donuts to ensure that they run short by no more than 22% of the time.

10. The amount of time that university professors devote to their jobs per week is normally distributed with a mean of 52 hours and a standard deviation of 6 hours. What is the probability that the amount of work per week for a randomly selected professor is more than 60 hours?
ANSWER: There is a 9.18% chance that a randomly selected professor will work more than 60 hours a week.

11. The per diem costs for business travelers in various cities include three meals in business-class restaurants and single-rate lodging in business-class hotels. The average per diem cost is $411.06 and the standard deviation of the per diem cost is $36. What is the probability that a per diem cost for a randomly selected city will be less than $452.63?
ANSWER: There is a 87.49% chance that the per diem cost for a randomly selected city will be less than $452.63.

12. The U.S. Environmental Protection Agency publishes figures on solid waste generation in the United States. One year, the average number of waste generated per person was 3.58 pounds. Suppose the daily amount of waste generated per person is normally distributed, with a standard deviation of 1.04 pounds. Of the daily amounts of waste generated per person, 37.72% would be greater than what amount?
ANSWER: The amount of waste generated per person by 37.72% of the population would be at least 3.9024 pounds.

13. A research report states that the average monthly cell phone bill is $42.78. Suppose local monthly cell phone bills are normally distributed, with a standard deviation of $11.35.

A.) What is the probability that a randomly selected cell phone bill is more than $67.75?

ANSWER: There is a 1.39% chance that a randomly selected cell phone bill is more than $67.75.

B.) What is the probability that a randomly selected cell phone bill is between $30 and $50?

ANSWER: There is a 60.97% chance that a randomly selected cell phone bill is between $30 and $50.

C.) What is the probability that a randomly selected cell phone bill is no more than $25?

ANSWER: There is a 5.82% chance that a randomly selected cell phone bill is no more than $25.

D.) What is the probability that a randomly selected cell phone bill is between $45 and $55?

ANSWER: There is a 28.06% chance that a randomly selected cell phone bill is between $45 and $55.

E.) What is the highest cell phone bill that could be classified in the bottom 10% of cell phone bills?

ANSWER: To be classified in the bottom 10% of cell phone bills, a cell phone bill must be no more than $28.252.

F.) What is the lowest cell phone bill that could be classified in the top 35% of cell phone bills?

ANSWER: To be classified in the top 35% of cell phone bills, a cell phone bill must be no less than $47.2065.

G.) What is the probability that a randomly selected cell phone bill is between $27 and $38?

ANSWER: There is a 25.49% chance that a randomly selected cell phone bill is between $27 and $38.

14. Data accumulated shows that the average wind speed in miles per hour for Corpus Christi, Texas, is 9.7. Suppose that the wind speeds are normally distributed with a standard deviation of 2.23 miles per hour. What should the lowest wind speed be 22.45% of the time?

ANSWER: To be classified in the top 22.45% of wind speeds, the wind speed must be at least 11.3948 miles per hour.

15. In a recent year, the average price of a Microsoft Windows Upgrade was $90.28. Assume that prices of the Microsoft Windows Upgrade that year were normally distributed, with a standard deviation of $8.53. If a retailer of computer software randomly selected that year, what is the probability that the price of a Microsoft Windows Upgrade was between $90 and $92.25?

ANSWER: There is a 10.30% chance that the price of a Microsoft Windows Upgrade was between $90 and $92.25.