Question 1

Annual demand for a particular brand of running shoes in a department store is normally distributed with mean $\mu=800$ and standard deviation $\sigma=200$.

(a) What is the mean and standard deviation of weekly demand?
(b) What is the mean and standard deviation of monthly demand?

Question 2

Bagel Co. sells five different types of bagels every day. Daily demand for each type of bagel is normally distributed with mean and standard deviation given in the table below.

<table>
<thead>
<tr>
<th>Bagel type</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>200</td>
<td>250</td>
<td>500</td>
<td>600</td>
<td>300</td>
</tr>
<tr>
<td>Std. dev.</td>
<td>40</td>
<td>50</td>
<td>100</td>
<td>200</td>
<td>80</td>
</tr>
</tbody>
</table>

What is the distribution (and its parameters) for the total monthly demand for bagels in the store? (Assume 30 days per month.)

Question 3

Consider the following optimization problem where $a_j$ and $b_j$ are positive constants and $x$ is a nonnegative variable.

$$\min f(x) = \sum_{j=1}^{n} \frac{a_j}{x} \cdot \frac{x+b_j x}{2}$$

(a) Is $f(x)$ convex or concave?
(b) Find the value of $x$ that minimizes $f(x)$.

Question 4

Solve Problem 5.5 on page 249.

Question 5

Seasonal demand for handbags in an online store is distributed normally with mean 150 and standard deviation 20.

(a) What is the probability that the demand for handbags in a given season does not exceed 200?
(b) What is the probability that the demand for handbags in a given season is at least 50?

Use Table A-4 in the back of the book.