Exercises 2

PROBLEM 1: Bond Rating 1

A triple-A rated firm has a default probability of 0.0002 in any given year. What are the chances a triple-A firm defaults in the next 25 years?

PROBLEM 2: Bond Rating 2

According to historical data, a firm with a BBB bond rating has a 10.29% chance of default at some point over 40 years. Assuming the probability of default is the same from year to year, what must that probability be for a typical BBB-rated firm?

PROBLEM 3: Exercise on Mean and Variance

Consider two random variables, X and Y, with the following distributions:

<table>
<thead>
<tr>
<th>X</th>
<th>Pr(X=x)</th>
<th>y</th>
<th>Pr(Y=y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>20%</td>
<td>2</td>
<td>15%</td>
</tr>
<tr>
<td>6</td>
<td>22%</td>
<td>4</td>
<td>30%</td>
</tr>
<tr>
<td>10</td>
<td>58%</td>
<td>7</td>
<td>35%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12</td>
<td>20%</td>
</tr>
</tbody>
</table>

2. Assuming that X and Y are independent, compute both the variance and standard deviation of $X+Y$.

PROBLEM 4: Stock Return

Shares in companies A, B, and C have expected rates of return over the next year of 10%, 11%, and 15%, respectively. The standard deviation of the rate of return of each of the stocks is 6%, 8%, and 10% respectively. The returns on the stocks vary independently.

What is the expected value and standard deviation of the rate of return (over the next year) on a portfolio consisting of equal dollar amounts invested in all three stocks?