Assignment 1 - Simple Interest

1. Find the simple interest for each of the following. Round to the nearest cent.

<table>
<thead>
<tr>
<th>Interest</th>
<th>Principal</th>
<th>Rate</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>$100</td>
<td>$1000</td>
<td>5%</td>
<td>2 years</td>
</tr>
<tr>
<td>$25</td>
<td>$1000</td>
<td>5%</td>
<td>6 months</td>
</tr>
<tr>
<td>$13.70</td>
<td>$1000</td>
<td>5%</td>
<td>100 days</td>
</tr>
<tr>
<td>$775</td>
<td>$10,000</td>
<td>7.75%</td>
<td>1 year</td>
</tr>
<tr>
<td>$764.38</td>
<td>$10,000</td>
<td>7.75%</td>
<td>360 days</td>
</tr>
<tr>
<td>$1162.50</td>
<td>$10,000</td>
<td>7.75%</td>
<td>18 months</td>
</tr>
</tbody>
</table>

2. Bob invests $8000 at 6% for one year. Calculate the interest earned.

\[ I = \frac{P \times r \times t}{100} \]

\[ I = \frac{8000 \times 0.06 \times 1}{100} \]

\[ = \$480 \]

3. Murray deposits $1200 in a bank account earning 2.25% interest per year. Calculate the interest earned on his deposit after one year.

\[ I = \frac{P \times r \times t}{100} \]

\[ I = \frac{1200 \times 0.0225 \times 1}{100} \]

\[ = \$27 \]
4. Mary invests $1575 at 5.5% for 3 months. Calculate the interest earned.

\[ I = P \times r \times t \]
\[ I = 1575 \times 0.055 \times \left(\frac{3}{12}\right) \]
\[ I = \$21.66 \]

5. April invests $10000 at 4% for 30 days. Calculate the interest earned.

\[ I = P \times r \times t \]
\[ I = 10000 \times 0.04 \times \left(\frac{30}{365}\right) \]
\[ I = \$32.88 \]

6. Joe invests $3000 at 4.25% for 5 years. Interest is calculated annually. Calculate the interest earned.

\[ I = P \times r \times t \]
\[ I = 3000 \times 0.0425 \times 5 \]
\[ I = \$637.50 \]

7. Beth invests $3000 in the bank at 4.25% for 2 years. Interest is calculated semi-annually and added on to the investment. Calculate the interest earned at the end of the 2 years and the balance in her account.

<table>
<thead>
<tr>
<th>Time</th>
<th>Amount</th>
<th>Interest</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>After 6 months</td>
<td>$3000 \times 0.0425 \times (6/12)</td>
<td>$63.75</td>
<td>$3063.75</td>
</tr>
<tr>
<td>After 12 months (1 yr)</td>
<td>$3063.75 \times 0.0425 \times (6/12)</td>
<td>$65.10</td>
<td>$3128.85</td>
</tr>
<tr>
<td>After 18 months</td>
<td>$3128.85 \times 0.0425 \times \left(\frac{6}{12}\right)</td>
<td>$66.49</td>
<td>$3195.34</td>
</tr>
<tr>
<td>After 24 months (2 yrs)</td>
<td>$3195.34 \times 0.0425 \times \left(\frac{6}{12}\right)</td>
<td>$67.90</td>
<td>$3263.24</td>
</tr>
</tbody>
</table>
8. Josh takes the interest earned at the end of every year and adds it to his investment. Calculate the interest he earned after 5 years if he invests $3000 at 4.25% per annum. Interest is calculated annually.

<table>
<thead>
<tr>
<th>Year 1</th>
<th>3000 x 0.0425 x 1</th>
<th>127.50</th>
<th>$3127.50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 2</td>
<td>3127.50 x 0.0425 x 1</td>
<td>132.92</td>
<td>$3260.42</td>
</tr>
<tr>
<td>Year 3</td>
<td>3260.42 x 0.0425 x 1</td>
<td>138.57</td>
<td>$3398.99</td>
</tr>
<tr>
<td>Year 4</td>
<td>3398.99 x 0.0425 x 1</td>
<td>144.46</td>
<td>$3543.45</td>
</tr>
<tr>
<td>Year 5</td>
<td>3543.45 x 0.0425 x 1</td>
<td>150.60</td>
<td>$3694.05</td>
</tr>
</tbody>
</table>

earned $694.05 in interest.

9. Rayna invests $20,000 in a financial institution at 10%. Calculate the number of days it will take her investment to earn $1200 in interest.

\[ t = \frac{I}{Pr} = \frac{1200}{20000 \times 0.10} = 0.6 \text{ years} \]

\[ 0.6 \times 365 = 219 \text{ days} \]

10. Douglas Fir borrows money from his financial institution at an interest rate of 6.25% per year. If he pays $397.50 in interest after four years, calculate the amount of his loan.

\[ P = \frac{I}{r+} = \frac{397.50}{0.0625 \times 4} = \]

\[ = \$1590 \]
11. Matt takes $1575 in and puts it into a term deposit at his bank. Six months later he receives a letter saying he has earned $48.72 in simple interest. What is the interest rate of his term deposit?

\[ I = 48.72 \]
\[ P = 1575 \]
\[ r = \frac{I}{P} = \frac{48.72}{1575 \times \left(\frac{6}{12}\right)} \]
\[ = 0.061866 \]
\[ = 6.19\% \]

12. Matilda sells some property and deposits $85 000 into a term deposit earning 4.25% per year. She earns $13 812.50 interest on her investment. How long did Matilda leave her money in the bank?

\[ I = 13812.50 \]
\[ P = 85000 \]
\[ r = 0.0425 \]
\[ t = \frac{I}{P \times r} = \frac{13812.50}{85000 \times 0.0425} \]
\[ = 3.82\text{ years} \]
\[ = 3\text{ years and 10 months} \]

13. Ben invests some money into a friend’s business. He is promised 10% interest for a period of 16 months. At the end of 16 months, Ben is given $10 430.67 in interest. Calculate how much money Ben initially invested in his friend’s business.

\[ I = 10430.67 \]
\[ P = \frac{I}{r + \frac{t}{12}} = \frac{10430.67}{0.10 \times \left(\frac{16}{12}\right)} = \$78230.03 \]

14. Jordan invests $7800 for 15 months and earns $780 in interest. What was the annual interest rate?

\[ I = 780 \]
\[ P = 7800 \]
\[ r = \frac{I}{P + \frac{t}{12}} = \frac{780}{7800 \times \left(\frac{15}{12}\right)} \]
\[ = 0.08 = 8\% \]
15. Jan takes $16,000 she received for the sale of her horse to the bank and invests it at an annual interest rate of 3.25%. She earns $1,400 in simple interest. How many months did she leave her money in the bank?

\[
I = 1400 \\
P = 16000 \\
r = 0.0325 \\
t = \frac{I}{P \times r} = \frac{1400}{16000 \times 0.0325} \\
= 2.69 \text{ years} = 32 \text{ months approx.}
\]

16. Luke Wharm has two years to save $2,800 for a winter vacation. He has $10,000 to invest in a financial institution. Calculate the interest rate he requires to earn enough for his vacation.

\[
r = \frac{I}{P \times T} = \frac{2800}{10000 \times 2} = \frac{2800}{20000} = 0.14 \\
= 14\% \text{ approx.}
\]

17. Preston has $1,000 to invest in a financial institution. He decides to purchase a step bond that guarantees him 4.75% for the first year, 5.5% for the second year, and 6.75% for the third year. Calculate the total interest he will earn in three years.

\[
\text{Year 1: } 1000 \times 0.0475 \times 1 = 47.50 \\
\text{Year 2: } 1047.50 \times 0.055 \times 1 = 57.61 \\
\text{Year 3: } 1105.11 \times 0.0675 \times 1 = 74.59
\]

Total in account is $1,179.20

$179.20 interest earned.