8.50 - Questions Handout #s 1 - 13

Key Ideas

- Simple interest is calculated when money is borrowed or lent.
- The formula for simple interest is \( I = P \times r \times t \), where
  \[ I \text{ is the interest, in dollars} \]
  \[ P \text{ is the principal, in dollars} \]
  \[ r \text{ is the interest rate per year, in decimal form} \]
  \[ t \text{ is the time, in years} \]
- The total amount is found by adding the interest to the principal.

Communicate the Ideas

1. Describe three factors that affect the amount of interest your money
   earns in a simple interest account.

2. How can you use a fraction to express each time in years?
   a) 6 months  
   b) 4 months  
   c) 9 months

3. What's wrong? Kim deposits $100 into an account that pays 6% per
   year. Kim says, “Hey, if I leave this money in for 5 years, I'll earn over
   $3000 in interest! Look, I worked it out.” Here is Kim's calculation:
   \[
   I = P \times r \times t \\
   I = 100 \times 6 \times 5 \\
   I = 3000
   \]
   a) Find the error in Kim's solution and show a correct one.
   b) How can you tell Kim in a bad news/good news way about her mistake?

Check Your Understanding

Practise

For help with questions 4 to 6, refer to
Example 1.

4. Suppose you deposit $250 into an account
   for 2 years. The account earns 5% interest
   per year.
   a) How much interest is earned in 2 years?
   b) What does the deposit amount to after
      2 years?

5. Kelly buys a $500 bond that matures in
   4 years. The bond pays 6% interest per
   year.
   a) Determine the total interest earned.
   b) What is the value of the bond after
      4 years?
6. Tom leaves a deposit of $420 in a savings account for 3 years. The account earns 4.5% interest per year.
   a) How much interest is earned in 3 years?
   b) How much does the deposit amount to after 3 years?

For help with questions 7 to 9, refer to Example 2.

7. Pat deposits $325 into an account that earns 2.5% interest per year. Find
   a) the interest after 6 months
   b) the value of the deposit after 6 months

8. Cleo borrows $670 for 9 months. The loan company charges $12.5% interest per year.
   a) How much interest does Cleo owe?
   b) How much will she need to pay off the loan after 9 months?

9. Suppose you borrow $200 from a friend. Your friend charges $9.5% interest per year. You repay the loan after 3 months.
   a) How much interest will you have to pay?
   b) How much in total will you have to pay back?

Apply

10. You lend $1500 to a friend for 4 months, at an interest rate of 4.5% per year. What total amount will your friend have to pay back?

11. Eric deposits $175 for 6 months into an account that pays 7% interest per year. He deposits $200, for 6 months, into another account that pays 4% interest per year. Which account will earn more interest? Explain how you know.

12. Karen has $500 to invest for 4 years. Her bank offers two options.
   Account A: earns 5.5% interest per year
   Account B: earns 5/4% interest per year
   a) Which account should Karen invest in?
   b) How much more interest does it pay than the other account?

13. Suppose you purchase a $500 Canada Savings Bond that earns 5.4% interest per year.
   a) What will the value of the bond be when it matures in 4 years?
   b) If you cash in the bond after 3 years, the bank reduces the interest rate by 1%. What is the value of the bond in this case?

Extend

14. When you check your options at the bank, you find an account that earns 5.5% compound interest. The teller explains that compound interest is calculated using the balance in your account after each year.
   a) Use a table to find out the amount for a deposit of $500 after 4 years.

<table>
<thead>
<tr>
<th>Year</th>
<th>Principal</th>
<th>Rate</th>
<th>Interest</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$500.00</td>
<td>0.055</td>
<td>$27.50</td>
<td>$527.50</td>
</tr>
<tr>
<td>2</td>
<td>$527.50</td>
<td>0.055</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   b) What is the total amount of interest earned? Explain how you found this.
   c) How much more does compound interest provide than simple interest, at the same rate?