Math 11 aw Review – Interest and Principal

1. Determine what the decimal is for the following percents:
   a) 25%   b) 30%   c) 7%   d) 2.5%   e) 10.25%   f) 2 ¼ %   g) ½ %   h) 105 ½ %

2. The formula for determining simple interest is \( i = prt \)
   What does each letter in the formula stand for?
   \( i = \) _____________________________
   \( p = \) _____________________________
   \( r = \) _____________________________
   \( t = \) _____________________________

3. Determine the simple interest to be paid (use the above formula) in these situations:
   a) \( p = 5000 \) \( r = 7\% \) \( t = 2 \) years
   b) \( p = 7,250 \) \( r = 4.5\% \) \( t = 3 \) years
   c) \( p = 8,450.56 \) \( r = 5\% \) \( t = 4\frac{1}{2} \) years
   d) \( p = 15,000 \) \( r = 4\% \) \( t = 66 \) months

4. Use the information in question 3 above to determine what the total amount owed after the term is over is.
   a) _____________________________
   b) _____________________________
   c) _____________________________
   d) _____________________________

5. Use the information from questions 3 and 4 above to determine what the monthly payments will be for each loan.
   a) _____________________________
   b) _____________________________
   c) _____________________________
   d) _____________________________

6. John borrows $10,000 from his parents and agrees to pay a simple interest of 4% on the loan which he will have for 5 years. Determine his monthly payments.
7. We use the formula \( M = P \left(1 + \frac{r}{n}\right)^{nt} \) to determine the total amount owed, including interest, when compounding interest. Determine the value of \( M \) for these situations:

a) \( P = 6000 \quad r = 5\% \quad t = 3 \text{ years} \)

b) \( P = 7500 \quad r = 7.2\% \quad t = 3.5 \text{ years} \)

c) \( P = 15,250 \quad r = 4 \frac{3}{4}\% \quad t = 2000 \text{ days} \)

d) \( P = 25,000 \quad r = 7.05\% \quad t = 400 \text{ weeks} \)

8. Determine the interest paid in questions 7a and 7b.

a) 

b) 

9. Determine the monthly payments for questions 7c and 7d. Hint: First change time to years then into months.

c) 

d) 

10. Explain what the difference is between simple and compound interest. Be specific.

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11. We use the formula \( A = P \left(1 + \frac{r}{n}\right)^{nt} \) to determine the value of the amount owed at the end of the loan when there is periodic compounding.

a) What does the letter \( n \) represent in the equation? 

b) Determine the value of \( n \) when the compounding period is …. 

i) annually ____  

ii) monthly ____  

iii) semiannually ____  

iv) quarterly ____  

v) weekly ____  

vi) daily ____

12. Determine the value of \( A \) for these loan situations:

a) \( P = 8000 \quad r = 6\% \quad t = 3 \text{ years} \quad \text{compounding period is quarterly} \)

b) \( P = 15000 \quad r = 3 \frac{1}{2}\% \quad t = 5 \text{ years} \quad \text{compounding period is monthly} \)
13) Joan borrows $250,000 from the bank for 25 years. She pays 3 3/4 % interest on the loan, with a semiannual compounding period. Determine:
   a) The value of A
   
   b) The amount of interest paid
   
   c) The monthly payments
   
14. Below is table showing a personal loan calculator which indicates the monthly payments for a loan per $1000 borrowed. Use it to determine the total amount of the loan with interest for the following situations:

<table>
<thead>
<tr>
<th>Interest rate</th>
<th>1 year</th>
<th>2 years</th>
<th>3 years</th>
<th>4 years</th>
<th>5 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.5%</td>
<td>84.92</td>
<td>43.20</td>
<td>29.30</td>
<td>22.36</td>
<td>18.19</td>
</tr>
<tr>
<td>5%</td>
<td>85.61</td>
<td>43.87</td>
<td>29.97</td>
<td>23.03</td>
<td>18.87</td>
</tr>
<tr>
<td>6.25%</td>
<td>86.18</td>
<td>44.43</td>
<td>30.54</td>
<td>23.60</td>
<td>19.45</td>
</tr>
</tbody>
</table>

   a) $5000 loan at 6.25% for 2 years     b) $7500 loan at 5% for 3 years
   
   c) $12,247.67 loan at 3.5% for 4 years

15. Amy and Matt want to buy an $18,000 car. They have three options.
   Option 1: Take a loan out for 5 years at 6 1/2 % compounded monthly
   Option 2: Get a 5 year loan from a bank using the personal loan calculator above at 6.25%
   Option 3: Borrow money from a friend at 8% simple interest; to be paid out over 5 years.
   Which is the best value? Show your work.

16. Use the rule of 72 to determine how long it will take the principal to double for these rates:
   a) 8%       b) 6%       c) 3%       d) 10%

17. $5,000 is invested at 6% interest. Use the rule of 72 to determine how long it will take for its value to reach $80,000
Terms – know these terms – expect to have to match terms to definitions on the test

interest – money earned on an investment or fee paid for borrowing money

self service banking – banking done by machine without the help of a teller

full service banking – banking done with the help of a teller

transaction – any activity such as a cash withdrawal deposit, transfer, or payment

ATM – automatic teller machine

simple interest – interest calculated as a percentage of the principal

principal – the original amount invested or borrowed

term – the time in years for an investment or loan

compound interest – the interest paid on the principal plus interest

compounding period – the time between calculations of interest

rule of 72: a quick method of estimating the time it takes for an investment to double

credit – an agreement in which a borrower receives something of value and agrees to pay for it later.

finance charge – the total amount of interest paid to borrow a sum of money

cash advance – a withdrawal of cash using a credit card; interest is charged immediately

down payment – a partial payment sometimes required at the time of purchase

loan – money that is borrowed for a specific term; to be paid back with interest

amortization period – the time required to pay back a loan

line of credit – an approved loan amount that you can draw on as needed

overdraft protection – an agreement with a bank that allows you to withdraw more money from an account than you have, up to a specified amount.

default – failure to repay a loan

collateral – an item of value pledged by a borrower to secure a loan

asset – an item of economic value owned by an individual that could be converted to cash

secured loan – a loan where the borrower has agreed to turn over a certain item if they default on the payments

unsecured loan – a loan that the lender considers a low risk so there is no need for collateral

NSF – non sufficient funds – a charge related to not having enough money in an account to cover a purchase made

minimum payment – the minimum amount of money an individual must pay towards a credit card; usually calculated at 5% of the balance owing or $10, whichever is greater

service charge – monies charged towards a bank account for various services rendered by the bank

GIC – guaranteed investment certificate