MATH 120 3.1 Simple Interest

Simple Interest Formulas (Given on the exam)

\[ I = Prt \]
\[ A = P + Prt \]
\[ A = P(1 + rt) \]

I = interest
P = principal (present value)
r = annual interest rate in decimal form
t = time in years
A = amount after time (future value)

Examples

1. If $24000 is loaned for 4 months at 10.5% annual rate, how much interest is earned?

\[ I = Prt \]
\[ I = (24000)(0.105)(4 \text{ month} \times \frac{1 \text{ year}}{12 \text{ months}}) \]
\[ I = 8840 \]

2. How much interest will you have to pay for a credit card balance of $1152 that is 1 month overdue, if a 13% annual rate is charged?

\[ I = Prt \]
\[ I = 1152 \times 0.13 \times 1 \text{ month} \times \frac{1 \text{ year}}{12 \text{ months}} \]
\[ I = 12.48 \]
3. A loan of $26,000 was repaid at the end of 20 months. What size repayment check (principal and interest) was written, if an 4.3% annual rate of interest was charged?

\[ A = P(1 + rt) \]

\[ A = 26000 \left(1 + 0.043 \times \frac{20}{12}\right) \]

\[ A = \$27863.33 \]

4. A loan of $890 was repaid at the end of 18 months with a check for $915. What annual rate of interest was charged?

\[ I = Prt \]

\[ A = P + Prt \]
\[ A = P(1 + rt) \]

\[ 915 = 890 + 890r \left(\frac{18}{12}\right) \]
\[ -890 \]
\[ 25 = \frac{1335r}{15} \]
\[ \frac{1335}{15} \]
\[ 0.01873 = r \]

\[ 0.01873 \times 100\% = 1.873\% \]
5. If you paid $24 to a loan company for the use of $1750 for 190 days, what annual rate of interest did they charge?

\[ I = Prt \]

\[ 24 = 1750 \cdot r \cdot \frac{190}{365} \]

\[ 24 = 910.9589041r \]

\[ r = \frac{24}{910.9589041} = 0.0263458 \times 100\% \]

\[ r = 2.63\% \]

6. What is the purchase price of a 50-day T-bill with a maturity value of $1186 that earns an annual interest rate of 3.562% (Assume a 360 day year).

\[ A = 1186 \]

\[ r = 0.03562 \]

\[ t = \frac{50}{360} \]

\[ A = P(1 + rt) \]

\[ 1186 = P \left(1 + 0.03562 \times \frac{50}{360}\right) \]

\[ P = \frac{1186}{1 + 0.03562 \times \frac{50}{360}} \]

\[ P = \$1180.16 \]