

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?

$$I = Prt$$

$$I = (24000)(0.105)\left(4 \text{ months} \times \frac{1 \text{ year}}{12 \text{ months}}\right)$$

$$I = 8840$$

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?

$$I = Prt$$

$$I = 1152 * 0.13 * 1 \text{ month} \times \frac{1 \text{ year}}{12 \text{ months}} = 12.48$$

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?

$$A = P(1 + rt)$$

$$A = 26000 \left(1 + 0.043 * \frac{20}{12} \right)$$

$$A = \$27863.33$$

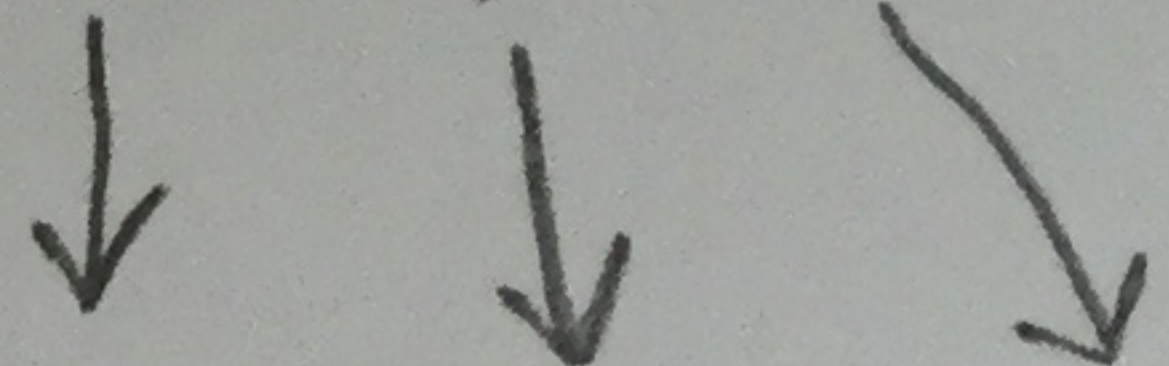
4. A loan of \$890 was repaid at the end of 18 months with a check for \$915. What annual rate of interest was charged?

$$I = Prt$$

$$r = ?$$

$$A = P + Prt$$

$$A = P(1 + rt)$$



$$\begin{array}{r} 915 = 890 + 890r \left(\frac{18}{12} \right) \\ -890 \quad -890 \end{array}$$

$$\begin{array}{r} 25 = 1335r \\ \hline 1335 = 1335 \end{array}$$

$$0.01873 = r$$

$$0.01873 \times 100\% = 1.873\%$$

$$\text{rate} = 1.873\%$$

$$I = prt$$

$$A = P(1 + rt)$$

$$A = P + prt$$

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).

$$A = 1186$$

$$r = 0.03562$$

$$t = \frac{50}{360}$$

$$P = ?$$

$$A = P(1 + rt)$$

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

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

$$P = \$1180.16$$