MAT 110 Vocabulary CH 8

8.2

PRINCIPAL: amount you deposit

INTEREST RATE: percentage of your deposit usually expressed as an annual rate

SIMPLE INTEREST: \[ I = Prt \] ( \( I \) = Interest earned, \( P \) = Principal, \( r \) = interest rate as a decimal, \( t \) = time in years)

FUTURE VALUE using simple interest: \[ A = P(1 + rt) \] --- \( A \) = future value, \( P \) = principal, \( r \) = rate as a decimal, \( t \) = time in years

COMPOUND INTEREST: interest that is paid on principal plus previous earned interest

\[ A = P(1 + \frac{r}{n})^{nt} \] \( A \) = future amount, \( P \) = principal, \( r \) = rate as a decimal, \( n \) = number of times compounded in a year (annually = 1, quarterly = 4, monthly = 12, etc), \( t \) = time in years

LOG PROPERTY: \[ \log y^x = x \log y \] (needed when solving for a variable in the exponent)

8.3

ADD-ON INTEREST METHOD: monthly payment on an installment loan: monthly payment = \( \frac{P + I}{n} \) where \( P \) is the amount of the loan, \( I \) is the amount of interest due on the loan, \( n \) is the number of monthly payments

UNPAID BALANCE METHOD: use \( I = Prt \) but use the following in the formula: \( P \) = previous month’s balance + finance charge + purchases made – returns – payments; \( r \) is the interest rate as a decimal and \( t = \frac{1}{12} \)

AVERAGE DAILY BALANCE METHOD: a more complicated method for determining the finance charge but is the most commonly used.

1. Add up the balances for each day during the month
2. Divide this by the number of days in the month (this amount is the average daily balance)
   
   Finance charge = (amount from step 2) \( \cdot \) (interest rate) \( \cdot \) (\# of days in the month divided by 365)

8.4

ANNUITY: an interest bearing account into which a series of payments are made of the same size

ORDINARY ANNUITY: an annuity where one payment is made at the end of every compounding period

FUTURE VALUE OF AN ANNUITY: the amount in the account including interest after making all payments

FORMULA FOR FUTURE VALUE OF AN ORDINARY ANNUITY: \[ A = R \cdot \frac{(1 + \frac{r}{m})^{nt} - 1}{\frac{r}{m}} \]
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R – the regular payments
n – total number of regular payments
m – how many times a year interest is being compounded
r – interest rate as a decimal

SINKING FUND: an account into which regular payments are made for the purpose of saving some specified amount in the future. The same formula is used as above, but you know A and are solving for R.

8.5

AMORTIZATION: paying off a loan by making a series of regular, equal payments

AMORTIZED LOAN: a loan paid off by making a series of regular, equal payments

Formula for finding payments on an amortized loan (from book):

\[ P \left( 1 + \frac{r}{m}\right)^n = R \cdot \frac{\left(1+ \frac{r}{m}\right)^n - 1}{\frac{r}{m}} \]

\( P \) = amount borrowed, \( m \) = # of payments per year, \( n \) = total # of payments, \( r \) = interest rate, \( R \) = amount of your payment

Solved for \( R \):

\[ R = \frac{PR}{m - \frac{m}{\left(1+ \frac{r}{m}\right)^n}} \]

This is not in the book, but it may make it easier for some students.

AMORTIZATION SCHEDULE: a list showing payment-by-payment how much is going to principal and interest

PRESENT VALUE OF AN ANNUITY: the amount you can borrow if you know the monthly payment, the interest rate, and the number of payments

\[ P \left( 1 + \frac{r}{m}\right)^n = R \cdot \frac{\left(1+ \frac{r}{m}\right)^n - 1}{\frac{r}{m}} \]

For this type of problem, solve for \( P \)

UNPAID BALANCE ON A LOAN: \( U = P \left( 1 + \frac{r}{m}\right)^n - R \cdot \frac{\left(1+ \frac{r}{m}\right)^n - 1}{\frac{r}{m}} \)

NOTE: \( n \) = number of payments that you have made so far.